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COMMITTEE PRINT

PATENT PRACTICES OF THE DEPARTMENT OF THE INTERIOR

PRELIMINARY REPORT

OF THE

SUBCOMMITTEE ON
PATENTS, TRADEMARKS, AND COPYRIGHTS

OF THE

COMMITTEE ON THE JUDICIARY
UNITED STATES SENATE
EIGHTY-SEVENTH CONGRESS, SECOND SESSION

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FOREWORD

The report discloses that the Department of the Interior is being given increasing responsibility in the stewardship of Government scientific research as proven by the recent Saline Water Conversion, Helium Gas, and Coal Research and Development Acts. The Department research is conducted through its various specialized agencies; i.e., U.S. Geological Survey, Bureau of Commercial Fisheries, Division of Sport Fisheries, Bureau of Reclamation, National Park Service, Office of Saline Water, Bonneville Power Administration, Bureau of Mines, and the Office of Coal Research.

This report, prepared by Herschel F. Clesner while a member of the subcommittee staff, is part of the subcommittee's study of the U.S. patent system conducted pursuant to Senate Resolution 267 of the 87th Congress, 2d session. It is the 15th of a series dealing with the patent practices of the various agencies of the U.S. Government. The purpose and scope of these reports has been fully described in the forewords of the first two covering the Tennessee Valley Authority and the National Science Foundation, respectively.

As shown by this report, the Saline Water Conversion, Helium Gas, and Coal Research and Development Acts provide primarily for research and development which has a direct public interest and as a result the contracting phases are controlled by statutory language which requires that any inventions, information, and results developed as a result of funds authorized for these programs shall be made available to the U.S. public.

Another interesting disclosure found in this report is that cooperative research performed by employees of the Bureau of Mines with funds provided by industry and the Government has resulted in inventions which have had significant utilization and that the Government has retained title to the inventions in order that they be made available to all units of industry. In practically all instances the latter practice is the Department's policy regarding inventions developed as a result of contracts and grants funded by the Department.

JOHN L. MCCLELLAN,
Chairman, Subcommittee on Patents, Trademarks, and Copyrights, Committee on the Judiciary, U.S. Senate.

AUGUST 20, 1962.

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PRELIMINARY REPORT AS TO THE PATENT PRACTICES OF THE DEPARTMENT OF THE INTERIOR

I. Legal Authority as to Patents

There are no statutes specifically relating to patent matters that vests responsibilities in the Department of the Interior as an overall departmental function.

However, the Coal Research and Development Act (Public Law 85–599, 74 Stat. 336), which authorizes the Secretary of the Interior to encourage and stimulate the production and conservation of coal in the United States through research and development and to contract for coal research, does contain specific language which relates to patents, processes, and information developed in carrying out the functions of the act. The Secretary in carrying out the research authorized is governed by the language of section 6 of the act, which states:

> No research shall be carried out, contracted for, sponsored, co-sponsored, or authorized under authority of this Act, unless all information, uses, products, processes, patents and other developments resulting from such research will (with such exceptions and limitations, if any, as the Secretary may find to be necessary in the interest of national defense) be available to the general public. Whenever, in the estimation of the Secretary, the purposes of this Act would be furthered through the use of patented processes or equipment, the Secretary is authorized to enter into such agreements as he deems necessary for the acquisition or use of such patents on reasonable terms and conditions.

The Helium Act Amendments of 1960 (Public Law 86–777, 74 Stat. 918), which amended the Helium Act of March 3, 1925, also contains specific language relating to patents. This language is similar to the language of the Coal Research and Development Act and is referred to as the O'Mahoney amendment.[1] It may be found in section 4 of the act as a proviso, which states:

> *Provided, however*, That all research contracted for, sponsored, co-sponsored, or authorized under authority of this Act shall be provided for in such a manner that all information, uses, products, processes, patents and other developments resulting from such research developed by Government expenditure will (with such exceptions and limitations, if any, as the Secretary may find to be necessary in the interest of national defense) be available to the gen-

[1] Sec. 4 of the Helium Act Amendments of Sept. 13, 1960 (74 Stat. 920; 50 U.S.C. 167b). See Senate Committee on Interior's report to the Senate (S. Rept. 1814, 86th Cong.) which refers to this proviso as the O'Mahoney amendment.

> eral public: *And provided further*, That nothing contained herein shall be construed as to deprive the owner of any background patent relating thereto to such rights as he may have thereunder.

In the 87th Congress the saline water conversion program was expanded and extended (Public Law 87–295, 75 Stat. 628). This act gave the Secretary of the Interior the authority to "acquire secret processes, technical data, inventions, patent applications, patents, licenses * * * by purchase, license, lease, or donation." This act contains the same proviso as found in section 4 of the Helium Gas Act. Further, section 8 of the Saline Water Act provides:

> That every such contract or agreement made with any public or private agency in a foreign country shall contain provisions effective to insure that the results or information developed in connection therewith shall be available without cost to the United States for the use of the United States throughout the world and for the use of the general public within the United States.

The Administrator of the Bonneville Administration has the power to acquire patent rights necessary to carry out the purpose of the Bonneville project.[2] The Secretary of the Interior also has the authority necessary to acquire any patent rights necessary to the Fort Peck project.[3]

Under the Synthetic Liquid Fuels Act of April 5, 1944 (30 U.S.C. 321–325), and amendments, the Government Printing Office issued Bureau of Mines Bulletins 467, 468, and 574. These three bulletins contain respectively 360, 650, and 134 pages of abstracts of patents (1845 to 1956) relating to oil shale and its products. Also under the Synthetic Liquid Fuels Act bulletins were published on patents relating to the pressure hydrogenation of coal and the Fischer-Tropsch synthesis and related processes. The Synthetic Liquid Fuels Act was not extended beyond April 1955 but it stimulated much increased activity in the fields of oil shale and coal conversion research. As a result it was noted that many patent applications were filed.[4]

A. RESEARCH AUTHORITY OF THE DEPARTMENT OF THE INTERIOR

The Department of the Interior is required, under the Saline Water Conservation Act, as amended, to develop practical low-cost means of producing from sea water or other saline waters, water of quality suitable for agricultural, industrial, municipal, and other beneficial consumptive uses.[5] Further the Department is authorized to make research grants and contracts; to conduct research and technical development work; to make engineering studies; determine the best plant designs; study methods for recovery, marketing of byproducts; to acquire secret processes, technical data, inventions; and engage research specialists and personnel to carry out any part of the research.[6]

The Department conducts inquiries and scientific, technological, and metallurgical investigations in the preparation, treatment, and

[2] 16 U.S.C. 832(d).
[3] 16 U.S.C. 833a(d).
[4] "Introduction Index of Oil-Shale and Shale-Oil Patents, 1946–56," Simon Klosky Bulletin 574, Bureau of Mines, Department of Interior.
[5] 42 U.S.C. 1951.
[6] 42 U.S.C. 1952.

utilization of mineral substances, the improvement of safety and efficiency, and in explosives, peat, mineral fuels, and unfinished mineral products.[7]

The Department is required to make experiments and investigations of lignite coals and peat; to determine the commercial and economic practicability of their utilization in producing fuel, oil, gasoline substitutes, ammonia, tar, solid fuels, gas for power and other purposes; to provide fertilizers and other byproducts which may be commercially valuable; to develop efficient methods, equipment, and devices for burning lignite char; to determine and develop methods and more efficient use of subbituminous lignite coal for purposes of generating electric power; to improve conditions, methods, and equipment as to health safety and prevention of waste in mining, ore reduction, metallurgical, and other mineral industries; in the use of explosives, electricity, safety methods, and appliances; and in the prevention of mine fires.[8]

The Congress authorized the Department to establish research laboratories relating to lignite coal and coal resources [9] and a laboratory for research, investigation, and as a center for information and assistance in matters pertaining to the mining, preparation, metallurgy, use, and conservation of rare and precious metals.[10]

The Department is required also to provide research services for the economic and technological development of anthracite coal, conservation of wildlife and fisheries; research into the basic problems of fisheries; studies and investigations on the effects of insecticides, herbicides, fungicides, pesticides, upon fish and wildlife; research into the effect of domestic sewage, mine, petroleum and industrial waste or erosion, silt, or other polluting substances on wildlife; feeding and spawning devices; engineering and experimental means to insure conservation of fish and wildlife; exploration into oceanographical, biological, technological work in order to develop and use high seas fishery resources; experimentation to eliminate and eradicate dogfish sharks; a salmon cultural experiment station, high sea fishery experiment stations with necessary instrumentation and gear.[11]

Further, the Congress requires the Department to investigate sea lampreys and their effects on fisheries, to eliminate and eradicate the sea lamprey in the Great Lakes, and do research in this direction.[12]

To conduct research to determine fish species and culture on a commercial basis in shallow reservoirs and flooded ricelands, methods for the production of stocking fingerling fishes, and to develop methods for the control of parasites and diseases of fishes.[13]

The Office of Saline Water has made a number of grants under its broad authority. However, other agencies of the Department may issue research grants to nonprofit organizations under the authority granted by Public Law 85–934, 85th Congress, 2d session, but as yet they have not.

[7] 30 U.S.C. 3.
[8] 30 U.S.C. 4.
[9] 30 U.S.C. 401.
[10] 30 U.S.C. 411.
[11] 30 U.S.C. 571; 16 U.S.C. 742c(a); 16 U.S.C. 742d–1; 16 U.S.C. 744; 16 U.S.C. 755; 16 U.S.C. 758c; 16 U.S.C. 760a.
[12] 16 U.S.C. 921.
[13] 16 U.S.C. 778.

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The Department of the Interior, in carrying out its functions, contracts for and carries out projects which may produce inventions. The various agencies' employees, as a result of their duties, also have an opportunity to invent or innovate. The Department does not have the authority to sue for the infringement of patents assigned to it.

II. Present Practice

A. ADMINISTRATION

1. Organization and personnel

The administration of all patent matters is handled by the Solicitor's Office. This includes the preparation and filing of patent applications, the licensing of patents, and the determination of employee-inventors' rights. When requested, the staff aids the individual bureaus in patent contract questions. The staff also provides advice on any other problems arising in connection with Department business. Currently, the staff consists of the Assistant Solicitor for Patents, two attorney advisers, and a secretary.

The Department of the Interior has a Committee on Research and Development composed of representatives of the various bureaus in the Department. The Committee's function is to review the Department's scientific research and development program with the purpose of making recommendations. Inventions frequently arise as the result of research and development, therefore consideration of the patent policy of the Department falls within the Committee's scope.

The Committee is presently composed of the following members:

Dr. Thomas B. Nolan, Chairman, Director, U.S. Geological Survey.

Mr. Donald McKernan, Director, Bureau of Commercial Fisheries.

Dr. Raymond E. Johnson, Chief, Division of Sport Fisheries.

Mr. Newcomb B. Bennett, Jr., Assistant Commissioner, Bureau of Reclamation.

Mr. Daniel B. Beard, Chief, Division of Interpretation, National Park Service.

Dr. W. S. Gillam, Chief, Research Division, Office of Saline Water.

Mr. Arthur B. Jebens, Director, Division of Management Research.

Mr. Paul Zinner, Assistant Director of Programs, Bureau of Mines.

Mr. Morgan Dubrow, Assistant Manager, Bonneville Power Authority.

Mr. Charles H. Stoddard, Director, Departmental Technical Review Staff.

Each of the various bureaus in the Department negotiate their own research and development contracts or cooperative agreements.

The Division of Personnel Management is responsible for developing and formulating personnel policies and practices regarding employee inventions.

2. Performance statistics

Following are the patents applied for, obtained and assigned to the Government during the period July 1, 1937, through 1960:

a. Statistical summary

July 1, 1937–Dec. 31, 1960

Year	Patents applied for	Patents obtained	Patents assigned to Government	Year	Patents applied for	Patents obtained	Patents assigned to Government
1937 (July–December only)	5	0	0	1950	33	25	21
1938	6	3	2	1951	45	33	29
1939	2	2	2	1952	38	47	45
1940	7	2	2	1953	23	22	21
1941	5	4	2	1954	2	13	13
1942	26	9	7	1955	2	18	18
1943	19	3	1	1956	9	15	14
1944	32	17	13	1957	[1] 20	11	11
1945	43	9	8	1958	[1] 24	4	4
1946	54	8	7	1959	19	11	11
1947	27	10	9	1960	16	[2] 8	[2] 8
1948	21	12	12	Total	536	307	279
1949	55	21	17				

[1] 2 in Canada.
[2] 1 in Canada.

See appendix A for a partial list of patents held by the Department of the Interior.

B. POLICY AS TO THE RETENTION OF TITLE

1. By employees

The matter of ownership and administration of patent rights in inventions created by Government employees as the result of or which relate to the employees' official duties has been of concern to the Department of the Interior for many years. As far back as 1921, the then Secretary of the Interior initiated an interagency conference pursuant to Department Executive Order 2731. As a result a five-man Interdepartmental Patents Board was established to study and to recommend a Government policy and program with respect to handling the patent rights in inventions made by Government employee-inventors.

The Board submitted its report in November 1923 and recommended a flexible patent ownership policy whereby the Government would own and control inventions developed in an agency's field of work in which the public's interest was paramount. The Board felt that the employee-inventors should be permitted to retain and exercise rights of ownership in (1) inventions of such a nature that the Government would only be interested in a license (2) inventions of special interest to the Government but where greater property rights protection to the inventor is needed to obtain commercial development.

The Board devoted much time and effort in attempting to formulate a uniform Government patent administration policy. However, efforts to establish a general governmental policy for owning and administering inventions and patents arising from governmental expenditures were inconclusive.

The general policy of the Department of the Interior up to November 17, 1942, was to leave the commercial patent rights in inventions with the employee-inventor with the Government retaining a shop right or a license substantially in accordance with the common law (*United States* v. *Dubilier Condenser Corporation*, 289 U. S. 173). Yet, in a number of instances, employee inventors voluntarily assigned all property rights in their patents to the Government.

In 1941 the Department again began to reexamine its patent policy due in part to the major responsibilities delegated to the Department of the Interior by the Congress under the Strategic War Materials Act of 1939 and other such functions relating to the defense effort. As a result of this examination there developed the rationale in the Department that retention of commercial rights by employee-inventors raised questions of possible conflict of interest which were and could be inconsistent with the Department's role regarding the defense efforts.

Therefore, the Department of the Interior issued on November 17, 1942, Order 1763, which changed the earlier policy. This order required that all employees assign to the Government all rights to any invention made within the general scope of their governmental duties. The criteria for determining whether an invention falls within the scope of governmental duties was set forth in the order. Foreign invention rights were also held assignable to the Government under this order as the then Secretary of the Interior Ickes believed that private ownership of such rights was contrary to the best interests of the Government.

In the instances where the Secretary found that the interest of the United States did not require a full assignment of the patent rights of the employee, the requirement to assign the title would be waived. The employee-inventor, in turn, had to grant to the Government a royalty-free nonexclusive license to use the invention. However, in those instances where the invention was made outside the scope of the employee's governmental duties, the employee inventor was entitled to all rights in the invention. Where the Government undertook the prosecution of such invention patent applications the Government received in exchange the royalty-free right to manufacture and use the invention for governmental purposes.

While the requirement for assignment of patent rights to the Government was possibly more rigid under this departmental order than under Executive Order 10096, the promulgation of the Executive order has involved little or no change in the Department's actual operation since most inventions originating in the Department facilities would be assignable to the Government under either order. The current policy and procedures of the Department of the Interior concerning ownership of rights in inventions made by the departmental employees are set forth in the Department's patent regulations (43 CFR 6),[14] which are based upon Executive Order 10096 and the applicable administrative orders of the Chairman of the formerly existing Government's Patent Board.

The Department regulations provide that the Government is entitled to all domestic patent rights in any invention made by an employee of the Department (*a*) during working hours; (*b*) with a substantial contribution by the Government of facilities, equipment, materials, funds, information, or time of other employees on official

[14] App. D.

duty; (*c*) which bear a direct relationship to or is made in consequence of the official duties of the employee-inventor.

Title is left in the employee-inventor subject to a royalty-free license covering use by or for the Government where the Government's contribution is insufficient equitably to justify the assignment of the entire right or where the Government has insufficient interest in the invention to acquire the entire rights. Yet, the Department will still process patent applications for inventions created by its employees outside the scope of their employment, but retaining a royalty-free, nonexclusive, nontransferable license to use, by or for, the Government, the patented invention where the public interest warrants.

The objective and purpose of research conducted by the agencies of the Department is to benefit the public directly, for example, the development of saline water conversion units. Thus, the dominant proportion of the Department's research is of a public service nature and the legislative mandate is that the useful and patentable inventions which have come into being as a result of this research shall be available to the public.

This Department does not believe that publication is sufficient to protect the Government's and public's interest. It believes that a vigorous patent prosecuting policy is warranted and that the agency which conducts the research is the best equipped to carry out the technical aspects of contracting, patenting, and administering its own inventions in order to best adapt to agency needs and statutory directives. Also, the Government benefits as a result of interferences with applications belonging to others.

For the purpose of this study a brief case history of such an employee-invention interference example has been prepared.

a. Lamprey larvicide compound

The compound is one of the best lamprey larvicides discovered and to date is actually employed in the lamprey program. The Government application was filed on April 11, 1957. A foreign company filed a similar application in the United States on April 2, 1958, and which has a convention date of November 11, 1957, based on its foreign application. The foreign concern is the junior party to the interference. The issue will turn on derivation. The foreign company claims the invention was derived from them, which the Government denies.

By filing a patent application the Government was able to contest inventorship. If the Patent Office holds the Department of the Interior's Fish and Wildlife Service employee-inventors to be the first inventors, the Government will save all royalty payments. Should the Patent Office hold that the foreign company's employees were the first inventors, no royalties will be required to be paid to the foreign company until the patent issues.

If the Government had relied upon publication to bar any patent to others it would not have been successful. The Department's employee-inventors, together with a consultant, published a paper in a scientific journal in early 1958 describing their work with various chemicals as lampricides, including the specific compound. As the foreign company filed its application in its own country on November 5, 1957, this is its convention date. The publication appeared after the convention date and cannot be a reference against the foreign

company's U.S. application. Had the Government relied on the publication for a disclosure, the foreign company would have gotten a U.S. patent without too much delay, and would then have had a claim for royalties against the U.S. Government for any use of the material thereafter.

At present the Government has purchased more than a half-million dollars worth of the chemical. If the lamprey larvicide compound had been subject to a patent royalty payment, it is estimated that about $25,000 in royalties from 1959 to date, based on a reasonable 5-percent royalty rate, would have been paid to the patent holder. The process using the chemical is presently undergoing a thorough evaluation as to the actual results achieved so far by taking a lamprey census in selected areas. If the results show that the process has been successful, then the scope of treatment will be extended and the amount of chemical purchased annually will be vastly increased. Thus a private patent holder could, in this instance, reap royalties which during the 17-year lifetime of the patent could easily be as high as $1 million and if the Government relied on publication for protection, it would have to pay these royalties.[15]

2. Contractors, cooperators, and grantees

a. Contractors

(1) *Procurement contracts.*—Formal contracts for supplies and for construction include the standard forms prescribed by the General Services Administration for such purposes. GSA standard form 23A, applicable to construction contracts, provides in article 13 that the contractor will indemnify the Government in the event of a patent infringement claim against the Government in the case of supply contracts. The GSA standard form used by the Department of the Interior provides only that the contractor will furnish certain assistance in the event that a patent infringement action arises out of the performance of a contract which is brought against the Government. Such patent infringement claims against the Government are brought only in the Court of Claims pursuant to the provisions of title 28, United States Code, section 1498.

(2) *Research and development contracts.*—In recent years the Department of the Interior has received statutory authority and increased appropriations from the Congress which permits the Department to enter into an increasing number of research and development contracts. The Office of Saline Water, Bonneville Power Administration, Fish and Wildlife Service, the newly created Office of Coal Research and Development and the U.S. Geological Survey have entered into research and development contracts with private profit corporations. The Office of Saline Water is the agency in the Department of the Interior that presently lets the greatest number of research and development contracts.

As the Department allows each agency or bureau to handle its own contracting, variances in policy occur from agency to agency in the Department. Responsibility for the Department's patent policy was delegated to the Solicitor in 1945. The present Solicitor, to carry out this duty, achieve greater uniformity, and to assure that all research and development contracts are in line with the Department's

[15] See app. C, July 13, 1962, Time magazine article, p. 46, describing the successful development and experimental utilization of this particular lamprey larvicide compound.

policy, on July 25, 1961, announced the creation of the following procedure:

Before any research and development contract is signed, where the Government does not take title to any inventions arising as a result of the contract, the facts and circumstances which in the opinion of the contracting agency justify leaving title with the contractor should be specified in detail. This may include a recital of the contractor's background position in the field, his financial investment in the study of the problem, his technical know-how, special equipment, scientific and technical staff, and other factors which would be evidence indicating it would be inequitable for the Government to take title to any invention arising out of the contract. Such contract with the attached justification must be submitted to the Solicitor for review and approval before it shall be signed by the authorized agency officer.

The Department stated that its policy is that contracts on behalf of the Department of the Interior with private companies or organizations outside the Federal Government for the performance of research and investigation usually provide that domestic patent rights in any inventions made in the performance of the work will be assigned to the Government and that a license will be granted for the practice of the invention abroad for governmental purposes. Where it is inequitable for the Department to take title because of substantial independent contributions made by the contractor, or where the research is urgent and important, and suitable equities and arrangements cannot be negotiated on any other basis, exceptions have been made whereby resulting inventions may be retained by the contractor, but the Government is granted an irrevocable, nontransferable, royalty-free worldwide license to manufacture and use the invention.[16]

(a) Saline water contracts prior to September 22, 1961: A group of contracts in the field of saline water conversion entered into shortly prior to the Saline Water Act of September 22, 1961, contain additionally the right of the Government to issue sublicenses to foreign governments for governmental purposes in furtherance of the foreign policies of the United States. In these instances, the agreement also provides that the contractor grant nondiscretionary, nonexclusive licenses to others upon payment of a reasonable royalty.

If the contractor and an applicant for a license are unable to agree upon what constitutes a reasonable royalty within 60 days from the date the application for a license was received by the contractor, then either party may petition the Secretary of the Interior for a determination of the royalty rate to be charged. The burden of proof is on the contractor to establish the reasonableness of the royalty requested. The determination of the rate under such a proceeding applies to the applicant and to all other licensees under the involved inventions.

Pending the negotiations on the proceeding the applicant has the right to make, use, and vend the invention without payment of royalty. However, the contractor may request the Secretary of the Interior to fix an interim royalty rate pending disposition of the proceeding. The Secretary is required to fix such a royalty rate and the contractor shall grant a license which the applicant must accept. If the applicant fails to accept such a license or fails to pay the interim

[16] Exceptions of this nature are not made in the areas of saline water, coal research, and helium, as detailed in the opinion attached as app. F.

royalty, such actions are grounds for the denial or dismissal of his application. When the reasonable royalty rate is finally determined by the Secretary it is retroactive to the date the applicant filed his application for license.

Another feature worth noting in the recent Department of the Interior contracts of the Offices of Saline Water and Coal Research is the provision relating to background patents. Where a license is to be granted by the Government to the public (any interested party) on any foreground patent, it is the Department's position that it is essential that the licensee be able to use any background patent owned or controlled by the contractor necessary to the practice of the foreground patented invention. Otherwise, the Department feels the license issued would be purely illusory since the foreground patented invention could not be used. Reasonable terms for the license of any background patent are to be determined by the parties. However, the contract clause prohibits the contractor from seeking injunctive relief in enforcing his patent rights. Thus, in case of dispute, the prospective licensee can practice the patented invention without being enjoined, the patent owners remedy being solely for damages (reasonable royalties) in a lawsuit.

b. Cooperative agreements

One common arrangement for research and development work involving nongovernmental entities takes the form of a "cooperative agreement." In these cases the Department, through the interested bureau and the outside party, in effect pool their facilities and personnel in carrying out an investigation of mutual interest and benefit. In some instances the cooperator's contribution to the joint venture may include even a sum of money for specific or general expenses.

Under these agreements the Government retains its patent rights in any inventions which may be made by governmental employees assigned to the cooperative venture. Whenever practical and possible the Government also secures the domestic patent rights in any inventions made by employees of the cooperator, but if not, it does secure a royalty-free license under such rights and also a provision whereby nonexclusive, nondiscriminatory licenses will be made available to the public at reasonable royalty rates.[17]

c. Grants

The Department of the Interior and its agencies, especially the Office of Saline Water, have made one or more research grants to nonprofit organizations and therefore have formulated a policy regarding patent rights which might be derived from inventions developed as a result of such research. The current policy is that the patent rights will be assigned to the Government.

C. FOREIGN FILING

The decision as to what foreign protection the Government will secure is usually made after a U.S. patent application is filed by the Department. If no foreign patent will be sought, the inventor is allowed to file for foreign patent protection, at his own expense, subject, however, to giving the Government a royalty-free license to use the invention for governmental purposes in each country in which a

[17] See app. E, cooperative agreement clauses used by the Bureau of Mines and Fish and Wildlife Service.

patent is obtained. This is in conformity with the policy and procedures established by the Chairman of the Government Patents Board under the provision of Executive Orders 9865 and 10096. Recently, in the case of saline water contracts, because of administration policy, the Department insists on the right to issue sublicenses for purposes of foreign policy. In the case of coal research contracts, the Department does not consider the need as urgent nor the administration policy as binding and therefore the matter is subject to negotiation by the parties.

The Department has filed four patent applications covering certain inventions developed in the Fish and Wildlife Service, relating to the control of the sea lamprey in the Great Lakes, in Canada. One patent has issued and the other three still are pending. These inventions may be used in Canada as well as in the United States pursuant to the United States-Canadian Agreement on Great Lakes Fisheries of September 10, 1954, which was ratified and supplemented by the act of June 4, 1956 (70 Stat. 242).

D. USE OF PATENTS BY PARTIES RETAINING TITLE

1. Employees

No records are available to the Department of the Interior which show the extent of commercial utilization of patented inventions made by employees of the Department who have retained title.

2. Contractors and grantees

The Department of the Interior's records do not disclose the patented inventions which contractors and grantees have obtained. The Department does have notice of several pending applications filed by contractors. However, it is too early to determine or estimate the possible extent of the commercial use of these inventions to which the title is retained by the contractors.

3. Government

The Department of the Interior conducts its research through its many agencies, bureaus, and services. Through these agencies the Department conducts research in its own facilities and through contracting and grants. The Department grants upon request a royalty-free, nonexclusive license under the patents owned by the Government. Any of its inventions may be used without such a license because the Government does not prosecute infringers of its patents. As a result the Department's licensees are principally those users of those inventions who desire technical assistance from the Department in exploiting them. A list of the Government licensees under the Department of Interior's patents may be found as appendix B of this report. While the Department does not ordinarily require its licensees to report the extent of their use of the patents, it actively encourages the widest possible commercial use of all of them and has obtained data as to use of some of the inventions.

a. Fish and Wildlife Service

Various inventions have resulted from the Service's research, some of which appear to have commercial application. So far as is known, there is no commercial use made of any of these inventions by private industry. Inventions such as those in the field of predatory

sea lamprey control are in extensive use by the Government. Furthermore, licenses thereunder have been issued to a company supplying chemicals for use in the control method.

b. Bonneville Power Administration

To the best of the Department's knowledge none of the patents assigned to the Government arising out of research conducted by the Bonneville Power Administration are in commercial use.

c. Bureau of Reclamation

Various patented inventions arising out of research done in the Bureau of Reclamation have significant utilization. Such inventions relate to a method of killing submerged water weeds, a fish diversion louver system, a consistency meter, and a strain gage and other instruments. The following is a brief case history of the development, utilization, and economic significance of the method of killing submerged weeds:

(1) Method of killing submerged water weeds

Patent No.	Inventors	Title	Date issued
2,600,436	John M. Shaw, Thomas R. Bartley, and Richard S. Rosenfels.	Method of Killing Submerged Water Weeds....	June 17, 1952

(*a*) History and development: A program was initiated in the Bureau of Reclamation's Engineering Laboratories at Denver in 1946 to investigate methods for use in controlling weeds on irrigation systems. Shortly thereafter, a cooperative agreement was established between the Bureau of Reclamation and the Bureau of Plant Industry, Soils and Agricultural Engineering, Department of Agriculture, in which the two agencies worked cooperatively at Denver on weed problems of irrigation distribution system.

Submersed-aquatic plants infesting irrigation canals were one of the problems that received high priority in the cooperative program. A good inexpensive method was urgently needed for control of this type of weed.

One segment of the investigations on submersed-aquatic weeds involved the evaluation of the herbicidal activity of promising chemicals by treating excised portions of leafy pondweed at various concentrations for a limited contact time. In the daily routine of culturing the leafy pondweed for use in the bioassay tests, it was noted that the plant material growing in a metal container freshly painted with a coal-tar paint was severely injured. A sample of the solvent used in the coal-tar paint, coal-tar naphtha, was obtained from the paint laboratory and evaluated in the bioassay test. The solvent was found very effective in killing leaf and stem tissue of leafy pondweed at a low concentration and short contact time. Test results showed that an emulsifying agent had to be used to disperse the solvent in water to achieve this herbicidal effectiveness. Thus, the effectiveness of aromatic hydrocarbon solvents on submersed aquatic weeds was discovered in 1947 and a patent was granted on the method on June 17, 1952.

Much of the development of the method for use by irrigation operators was accomplished through field applications at various locali-

ties throughout the 17 Western States in 1947 and 1948. The development included the preparation of specifications requirements for purchase of the aquatic weedkiller, selecting a suitable emulsifying agent for use in dispersing the solvent, determining the best equipment for applying the material, and evaluating the optimum concentration and contact time required to produce a good kill.

(*b*) Commercial utilization and economic significance: The aromatic solvent method of controlling aquatic weeds was adopted rapidly by some water-users' organizations soon after its potentialities were demonstrated. Several oil and chemical companies had an aromatic solvent water weedkiller product on the market in a short time. It is estimated that over 100,000 gallons of aromatic solvents were used in 1948. The volume of solvent used has grown steadily since 1948 and it is now estimated to be over 600,000 gallons per year. The use of aromatic solvents has also created a market for about 10,000 gallons of emulsifying agent per year required to emulsify the solvent.

The discovery of the aromatic solvent method of aquatic weed control has made it possible to accomplish considerable savings. During the first 10 years of its use, the savings on merely Bureau projects has amounted to an estimated $1,550,000 and the savings to all water users for this period is estimated to be $6,200,000. The total current annual savings is estimated to be $1,200,000.

(*c*) Cost of development: The cost for developing the aromatic solvent method is considered nominal. The method was discovered through routine investigation procedures without requiring a lot of background information. The development of the method did not involve large expenditures for longtime studies or for specialized equipment and materials. Cost of development to the Government of the aromatic solvent method is estimated to be less than $10,000.

d. Office of Saline Water

To date three patented inventions have been assigned to the Government which are the result of research conducted under the Saline Water Conversion Act. At present the commercial utilization of saline water conversion is rather limited. However, one of these patented processes, the Badger process for the prevention of scale in sea water evaporators is potentially important and is being incorporated in demonstration plants now being built.

e. Geological Survey

Several of the patented devices invented by employees of Geological Survey, and assigned to the Government, are in commercial use. They include such patented inventions as an orthophotoscope, a vertical sketchmaster, rectoblique plotters, stereoscopic photographic projection mapping instrument, and others.

The following are brief case histories of the development, utilization and economic significance of instruments related to aerial photography:

(*1*) *Orthophotoscope*

Patent Nos.	Inventor	Title	Date issued
2,696,752	Russell K. Bean	Stereoscopic Photographic Mapping Instrument.	Dec. 14, 1954
2,737,846	do	Ellipsoidal Reflector Projector for Stereophotogrammetric Map Plotting.	Mar. 13, 1956
2,869,419	do	Orthophotoscope	Jan. 20, 1959

(*a*) History and development: The orthophotoscope, invented by Russell K. Bean, is a device which produces orthographic photographs (uniform-scale photographs). Serious development work on the orthophotoscope started in 1953 when a working experimental model was built. In 1956 the first engineered model was completed and in 1960 the Universal orthophotoscope was built. Each of the subsequent instruments represented significant improvements over its predecessors. At the present time, a fourth instrument is being developed which should be simpler in construction and less expensive to build and operate, thereby bringing the capability of uniform-scale photography within the reach of small commercial users.

(*b*) Commercial utilization and economic significance: Orthophotoscopes have been built for other Government agencies by the Chicago Aerial Surveys, and Reed Research of Washington, D.C. Development is still continuing so it is difficult to state how much commerical interest there will be; however, the production of uniform-scale photographs, if it can be done economically, presents a significant technical advantage to engineers, geologists, foresters, etc. Investigation as to the uses to which orthophotography will be put in topographic mapping operations is continuing. Most of the orthophotograph production to the present time has been for geologic studies, but its potential use in large segments of both the geologic and topographic mapping programs of the Survey is great.

(*c*) Cost of development: The cost of developing the orthophotoscope through the completion of the Universal model, thereby giving the Geological Survey two working instruments, is estimated at about $70,000.

(*2*) *Vertical sketchmaster*

Patent No.	Inventor	Title	Date issued
2,370,143	James Buckmaster	Camera Lucida Instrument Prismatic Unit Therefor.	Feb. 27, 1945

(*a*) History and development: The vertical sketchmaster is a small portable instrument based on the camera lucida principle, which permits the transfer of map-worthy detail from a vertical photograph to a plotting sheet. The device makes use of mirrors arranged so that the photograph and the plotting sheet can be viewed simultaneously. Provision is made for adjustments to (1) eliminate the effects of scale change and (2) make approximate tilt correction. This device, designed by J. L. Buckmaster and patented in 1946, has the advantage of being simple to operate and requiring no special photogrammetric training on the part of the operator. Pilot models of the sketchmaster were used experimentally beginning about 1930.

(*b*) Commercial utilization and economic significance: Development was completed about 1942 in the early stages of the trimetrogon world charting program for which it became one of the several key instruments. It was later used commercially be geologists, foresters, and others. The military purchased several thousand of them and it is estimated that a thousand were later sold commercially.

(*c*) Cost of development: The combined cost of development to the inventor and the Government did not exceed $1,000.

(3) Rectoblique plotter

Patent No.	Inventor	Title	Date issued
2,321,083	James G. Lewis	Rectoblique Plotter	June 8, 1943

(*a*) History and development: The rectoblique plotter was conceived and designed by James G. Lewis in 1942 and patented in 1943.

(*b*) Commercial utilization and economic significance: The instrument was used throughout the military services as part of the trimetrogon system of worldwide aeronautical charting and reconnaissance mapping. An estimated 2,000 of the instruments were manufactured and used by military agencies. There has been very little commercial use of the instrument.

(*c*) Cost of development: These plotters were built commercially by the Abrams Instrument Co., Lansing, Mich. The cost of development, exclusive of patent application, was approximately $1,000.

(4) Stereoscopic photographic projection mapping instrument

Patent No.	Inventor	Title	Date issued
2,968,869	Marvin Sher	Preparation of Maps	Jan. 24, 1961

This is a relatively new and significant development relating to photogrammetric mapping procedures employing stereotemplates and has been highly publicized. It has been adopted both by the Government and private industry, although no licenses have been issued. The inventor has received several awards for his invention among them a recent $1,600 employee incentive award.

f. Bureau of Mines

Many of the patented inventions which were derived out of the Bureau of Mines' research have achieved significant utilization. An important, recently issued, patented invention is a method for separating carbon dioxide and hydrogen sulfide from gas mixtures commonly known as the hot carbonate process. The importance of this process has received considerable recognition in literature and textbooks. Therefore it appears very probable that its commercial utilization is far greater than that which would appear from the licenses issued.

The following are brief case histories of the development, utilization, and economic significance of several inventions covered by 11 patents held by the Bureau of Mines.

(1) Dewpoint recording instrument

Patent No.	Inventor	Title	Date issued
2,281,418	William M. Deaton	Apparatus for Determining Dewpoint of Natural Gases Under Pressure.	Apr. 28, 1942
2,629,253	do	Moisture Content Recorder for Gases Under Pressure.	Feb. 24, 1953

(*a*) History and development: In a cooperative study between the Bureau of Mines and the American Gas Association during the period 1936–41, the inventor of this apparatus, William M. Deaton, in cooperation with E. M. Frost, Jr., developed an apparatus for determining the dewpoint of natural gases under pressure. The apparatus is now universally used throughout the United States and in foreign countries wherever information on the dewpoint of gas under pressure is needed. The apparatus is manually operated, hence is primarily suited for spot determinations.

As a result of this development, many inquiries were received from industry, principally the natural gas industry, for a continuously recording dewpoint instrument. Some preliminary investigations were made during 1940 and 1941 but these were interrupted by, and discontinued during, World War II.

Following World War II inquiries continued to be received indicating a desire and need for an apparatus to record the dewpoint of gases, and in 1948 arrangements were made to undertake such a development in cooperation with the American Gas Association.

Development of the recording instrument for measuring the dewpoint or moisture content of natural gases under pressure continued through the years 1948–53. An instrument was developed early in the period but it was necessary for it to undergo extensive field tests to prove its reliability and assure its acceptance by the natural gas industry. A patent covering the instrument was issued to the Bureau February 24, 1953, and a final summary report was published by the American Gas Association in April 1956.

(*b*) Commercial utilization and economic significance: Information obtained by the Bureau of Mines from Chandler Engineering Co., Tulsa, Okla., manufacturer of the continuously recording dewpoint invention shows that they have manufactured a total of 164 dewpoint recorders since 1950. The total dollar retail value of these units is estimated at $300,000.

In addition to the instruments manufactured by the above company, a few of the natural gas companies (three or more) are known to have manufactured the instrument in their own shops. Others also may have constructed the instrument.

The Bureau of Mines helium activity, has one or more of these dewpoint recorders in each of its five helium plants. In addition to its use strictly as a dewpoint recorder for natural gases, the instrument also has been used by the helium activity to record the hydrogen content of helium produced at each of the plants by adding certain additional equipment. The equipment consists of a high-pressure furnace filled with copper oxide, through which the helium is passed. Any hydrogen contained in the helium is converted to water vapor, which then is detected by the dewpoint recorder. By such a method hydrogen present in concentrations above 10 parts per million is detected and measured.

The manufacturer of the dewpoint recorder comments as follows:

> As far as is known, all purchasers and users of the instrument have been connected with the natural gas business, either as marketers, transmission companies, or users.
>
> It is difficult to evaluate the economic significance of this apparatus since it is used as a preventive measure to avoid expense which might be incurred if the information the in-

strument gives was not available. It should be presumed that users feel the investment is justified on the basis of estimated savings.

(*c*) Cost of development: Fiscal records of the helium activity regarding the development of the instrument to record the dewpoint or moisture content of natural gases under pressure show the cost to be about $41,000.

(2) Fluidized bed furnaces for drying solids

Patent No.	Inventor	Title	Date issued
2,666,269	Vernon F. Parry	Method of Drying Solids in a Fluidized Bed	Jan. 19, 1954
2,763,478	do	Apparatus for Drying Solids in a Fluidized Bed	Sept. 18, 1956

(*a*) History and development: These patents are based on work intiated at Golden, Colo., in 1947. The methods consist in rapidly drying the solid with hot gases in a fluidized bed and entraining the dry solid overhead, with separation in a cyclone, which allows the gases to be recycled to the heating furnace.

Further development was carried out in Denver in cooperation with the Texas Power & Light Co. and nine operating units using the method were subsequently installed and are operated by this company at Rockdale, Tex., for the Aluminum Co. of America. The nine operating units dry lignite which in turn is used to reduce aluminum at this plant site.

(*b*) Commercial utilization and economic significance: In addition to the Texas plant mentioned above, the Bureau states that there are at least two more plants in the United States using this process, both drying coal. There also is one plant in Canada, and reputedly several more plants are abroad that use this process.

The process offers a safe and efficient means for drying lignite, coal, and hydrocarbon fuels with some moisture content. It is more economical than conventional mill drying, because the dried product can be fired in a coarse size, eliminating the necessity of mill grinding. This is due to the almost complete elimination of moisture. The dried lignite is suitable for use in cement kilns, slagging type boilers, and other operations requiring intense heating.

(*c*) Cost of development: The initial and development cost to the Government was about $80,000. A similar amount was spent in the method's further development by the Texas Power & Light Co.

(3) Testing and prevention of embrittlement cracking in steamplants

Patent No.	Inventors	Title	Date issued
2,283,954	Wilburn C. Schroeder and Abraham A. Berk.	Apparatus for Testing the Embrittlement Cracking Characteristics of Solutions.	May 26, 1942
2,283,955	Wilburn C. Schroeder	Means for and Method of Testing Embrittlement Cracking Characteristics of Solutions.	May 26, 1942
2,297,670	Wilburn C. Schroeder and Abraham A. Berk.	Method of Protecting Boilers and the like Against Embrittlement.	Sept. 29, 1942
2,454,258	do	Water Treatment to Prevent Embrittlement Cracking.	Nov. 16, 1948

(*a*) History and development: Embrittlement cracking caused failures in boiler seams, sometimes with considerable loss of life and property, and was a serious problem when the Joint Research Committee on Boiler Feedwater Studies asked the Bureau of Mines to investigate some of the aspects of the problem cooperatively in 1932. The Bureau provided space and some manpower, at a cost that averaged considerably less than $10,000 for the nearly 10 years of the project. Industry's contribution, through the Joint Research Committee on Boiler Feedwater Studies, was about $100,000 or approximately 10 times that of the Government's investment.

The embrittlement detector is, in effect, a superposed seam through which boiler water circulates, to provide a sensitive environment in which the boiler water is tested for its tendency to cause cracking. Attached to autoclaves in the laboratory, it permitted the screening of various chemical methods to prevent cracking; attached to operating boilers, it evaluated the effectiveness of these methods in heating and power plants.

(*b*) Commercial utilization and economic significance: More than 1,000 detectors have been manufactured and used in boiler tests in this country alone, and the detector test has received worldwide use. The American Society for Testing Materials standardized the test method in ASTM designation D–807. Two basic patents were obtained in 1942. Two improvement patents were issued to the Department of the Interior in 1942 and 1948. The Department policy allows both instrument and boiler manufacturers to manufacture the invention and any user to utilize it. The basic patent protection on the detector expired in 1959. At that time, the cost of the detector, including the test specimen, was $50 ($15 more than the price in 1939). The principal manufacturer of this item is the Stout Machine Products Co., Reading, Pa.

It is difficult to put a price tag on the economic significance of the detector. The number of boiler failures from seam cracking was once large enough to cause this trouble to be considered a principal operating problem. Simple control methods, demonstrated with the detector to be effective, are now in common use. Failures still occur occasionally in relatively small plants where preventive treatment has not been applied; but seam cracking is no longer considered troublesome in steam generation. A minimal price tag on economic significance could start at $1 million a year.

(*c*) Cost of development: As stated above, the cost to the Bureau of Mines was less than $10,000 for nearly 10 years. Industry's contribution was about $100,000.

(*4*) *Electrolytic process for the extraction of metallic manganese*

Patent No.	Inventors	Title	Date issued
2,119,560	Stephen Shelton	Electrolytic Process for the Extraction of Metallic Manganese.	June 7, 1938
2,169,540	do	Purification of Manganese Sulphate Solutions	Aug. 15, 1939
2,439,805	Herbert Hanley and James Jacobs.	Method of Electrowinning Manganese	Apr. 20, 1948

(*a*) History and development: In 1934, the Bureau of Mines directed its attention to the development of a continuous process for production of electrolytic manganese. These studies continued in succeeding years.

In October 1936, Report of Investigations 3322, a Bureau of Mines publication, was released with a section entitled "Electrolysis of Manganese." A practical process for continuous deposition of electrolytic manganese was reported to have been achieved at this time. Later, work by the Bureau improved the process, and investigations were made of possible uses for the finished product, with Report of Investigation 3580 being released in September 1941.

The Bureau's work was encouraging to the point that a plant was built at Knoxville, Tenn., for commercial production of electrolytic manganese, construction being completed in 1939.

(*b*) Commercial utilization and economic significance: Using the basic Bureau of Mines patents plus some slight innovations, Electro Manganese Corp. began production in 1939. January 1941 is credited, however, as the start of actual commercial production with production for that year being approximately 600 short tons.

In 1941, the Bureau constructed an electrolytic manganese pilot plant at Boulder City, Nev., designed to produce 1 ton of metal per day. This plant produced 750 short tons of electrolytic manganese in the years 1942 through 1946, most of the product being used for coining the wartime manganese nickel.

In the meantime, Electro Manganese Corp.'s production of the metal continued to grow, and in May 1943 a defense plant corporation-financed addition to plant capacity was completed. Demand for the metal has continued to increase and further additions to the company's plant have been made. In 1956, Electro Manganese Corp. became a division of the Foote Mineral Co.

In 1954, Electro Metallurgical Co. (now a division of Union Carbide Metals Co.) became the country's second commercial producer of electrolytic manganese.

Both American Potash & Chemical Co. and Foote Mineral Co. recently announced plans for complete new plants. This marks the entry of another producer, American Potash & Chemical Co. in this commercial market. Foote's efforts mark a continued growth and expansion of their operation. These producers are or will be producing electrolytic manganese based on the basic patents developed by the Bureau of Mines. Reported consumption of manganese metal has grown from 1,900 short tons in 1954 to 12,800 in 1959, or approximately an increase of seven times in 5 years. At a price of 34 cents per pound, this represents a market value of more than $8,500,000 for 1959.

Recent increases in consumption are attributed largely to increased use in the production of open-hearth steel. Previously, stainless steels were responsible for a large portion of consumption. Other uses are in the making of nonferrous alloys, chemicals, pharmaceuticals, welding rods, and welding rod coatings. Electrolytic manganese is particularly useful where it is desired to introduce manganese without introducing impurities. Electrolytic manganese is 99.9 percent pure. Further the national stockpile calls for manganese 99.9 percent pure, and produced by this process.

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(c) Cost of development: A meaningful estimate of the cost of development to the Bureau would be difficult to determine because accounting practices during the pertinent period were not such as to supply the necessary information.

(5) *Mica paper and synthetic mica*

Patent No.	Inventor	Title	Date issued
2,711,435	Richard A. Humphrey	Electric Furnace and Electric Melting and Crystallizing Method for Minerals.	June 21, 1955
2,829,061	Jay E. Comeford and Robert A. Hatch.	Machinable Ceramic Bonded Material and Method for Producing Same.	Apr. 1, 1958
2,882,328	Edgar C. Worden	Controller for Regulating the Resistance of a Melt.	Apr. 14, 1959
3,008,802	Robert A. Hatch	Recrystallizing Reconstituted Fluorine Mica Sheet.	Nov. 14, 1961

The following are the pending applications which have been filed to indicate the volume of work in this area:

Mica paper and synthetic mica

Application serial No.	Inventor(s)	Title
807,737	Haskiel R. Shell and Norman A. Pace	Progressive Melting and Crystallization of Synthetic Mica.
7,732	Haskiel R. Shell	Fluormica-Fluoramphibole Ceramics and Processes of Making Same.
60,275	John L. Miller, Jr	Mica Paper.
89,588	Haskiel R. Shell	Water Swelling, Flexible Fluormica.

An area of extensive research carried on by the Bureau of Mines is the development of mica and synthetic mica.

In 1947 the Bureau of Mines began to conduct fundamental studies on synthetic mica at Norris, Tenn. Until June 1953 the work was carried on largely under working funds from the Office of Naval Research, the Bureau of Ships, and the Army Signal Corps. From July 1953 until October 1956, the Bureau work on synthetic mica was supported almost entirely from direct appropriations with minor assistance by private industry for a brief period. Since October 1956 Bureau appropriations for this research have been supplemented with Defense Production Act funds administered by the General Services Administration.

Research by the Bureau on synthetic mica has resulted in a number of major accomplishments and incidental products and discoveries. Because of the continuity of the program and the interdependence of the various avenues of investigation, crediting a particular development to a specific time in the program is not entirely accurate. However, developments during the synthetic mica research that have been financed principally from Bureau appropriations have resulted in several patents being issued and a number of patent applications pending in the Patent Office, and others are awaiting processing by the Solicitor's Office.

From the beginning, the broad objective of the synthetic mica research program has been to produce a material that will substitute

satisfactorily for strategic grades and qualities of natural mica block, film, and splittings. The original approach of attempting to produce large single crystals of synthetic mica was supplemented after a time by efforts directed toward delaminating and reconstituting flake synthetic mica into a sheet having electrical and mechanical properties needed in electronic applications. Most of the developments that have been considered for patent action concern techniques, materials, and equipment directly related to advancing one of these two approaches.

The only development of this research which is applied commercially at the present time is the process for manufacturing synthetic mica by internal electric-resistance melting. This process was developed in the search for a means of synthesizing large single crystals of mica. Although this process did not solve the problem of obtaining large crystals of synthetic mica in commercial quantities it did produce a material which rapidly found a market in the glass-bonded mica industry. A device was developed which is useful in controlling this process or any other using the melt to conduct the electric current furnishing heat to the reaction.

At least two companies presently use the Bureau process to produce synthetic mica for use in glass-bonded mica. Because of its better molding characteristics, superior high-temperature properties, and more attractive appearance glass-bonded synthetic mica not only has filled a number of specialized needs but also has displaced glass-bonded natural mica to an appreciable extent. Uses of glass-bonded mica include insulation in telemetering equipment, wire insulation, and other components in nuclear applications, and material for fabricating microwave equipment, switch panels, fuse boxes in aircraft, and sockets for miniature vacuum tubes.

Ceramic bonded micas are not used commercially but might be useful materials at some future time. Several of the new processes for making synthetic micas require further development to evaluate their industrial significance.

During basic research on synthesis of micas with various compositions, the processes of making the family of synthetic minerals of water swelling fluormicas was discovered. Their unusual properties were utilized to develop the process for producing a mica paper which differs widely from commercially available mica paper. The development so far is only in the preliminary stages but has aroused considerable interest in industry. Although the economic significance of this mica paper cannot be predicted yet, it stands a good chance of becoming a useful industrial material.

III. Agency Viewpoint

A. Effectiveness of Present Policy

The responsibility for the Department's patent policy was delegated to the Solicitor in 1945. After study, the present Solicitor issued a statement of the Department's patent policy on July 25, 1961. The Department's policy was restated as being that of taking title to any invention made under a research and development contract, except where it would be inequitable for the Department to take title because of substantial independent contributions to the invention by the contractor. However, in the case of Saline Water, Coal Research, and

Helium Act research, a contractor who gets title is required to issue licenses to the public at reasonable royalties. Further, any contract wherein title is to be left with the contractor must be submitted in advance to the Solicitor for review and approval, together with a reasonable justification.

After the passage of the Saline Water Act of September 22, 1961, the question of congressional intent was reviewed and after a searching analysis by the Solicitor's Office, it was decided by the Solicitor that the patent section of the Saline Water Act, the Coal Research Act and the Helium Act amended intended that all patents arising out of contracted research in these fields shall be made freely available to the public.[18] As a result, all contracts in these fields that have been negotiated in recent months include provisions which insure that any resulting inventions shall be made available to the public, free of charge. This may be accomplished by title in the Government, by joint title, title in the contractor with the right to issue sublicenses in the Government, dedication or by any other method so long as the desired result of making the invention freely available is obtained.

The Department believes that the above changes in their policy makes it presently more effective in carrying our their duties, the congressional intent, and promotes the public interest. Therefore the Department feels there is no need to depart from the present policy.[19]

B. RECOMMENDATIONS AS TO FUTURE POLICY

The Department of the Interior has not made any recommendations to the subcommittee because it believes the present policy to be effective and no specific instances in which a different policy might have proven more useful to the Government or in the public interest has come to its attention.

[18] Opinion attached as app. F.
[19] See app. G.

APPENDIXES

Appendix A

Partial list of patents held by the Department of the Interior

Patent No.	Inventor(s)	Title	Date issued
1,329,853	Rittman, Walter F.	Water and Oil Gas Manufacture	Feb. 3, 1920
1,330,008	do.	Cracking Hydrocarbon Oils	Do.
1,352,916	do.	Apparatus for Cracking Hydrocarbon Oils	Sept. 13, 1920
2,033,509	Bowie, Clifford P.	Mud Lining Oil and Gas Wells	Mar. 10, 1936
2,119,560	Shelton, Stephen M.	Electrolytic Process for the Extraction of Metallic Manganese.	June 7, 1938
2,169,540	do.	Purification of Manganese Sulfate Solutions	Aug. 15, 1939
2,273,750	Clagett, William Horace, Jr.	Instrument to Indicate Concrete Consistency	Feb. 17, 1942
2,281,418	Deaton, William M.	Apparatus for Determining Dewpoint of Natural Gases Under Pressure.	Apr. 28, 1942
2,283,954	Schroeder, Wilburn C., and Abraham A. Berk.	Apparatus for Testing the Embrittlement Cracking Characteristics of Solutions.	May 26, 1942
2,283,955	Schroeder, Wilburn C.	Means for and Method of Testing Embrittlement Cracking Characteristics of Solutions.	Do.
2,294,532	Fahey, Joseph J., Michael Fleischer, and William W. Rubey.	Method and Means for Extinguishing Burning Molten Magnesium and the Like.	Sept. 1, 1942
2,297,670	Schroeder, Wilburn C., and Abraham A. Berk.	Method of Protecting Boilers and the Like Against Embrittlement.	Sept. 29, 1942
2,321,033	Lewis, James G.	Rectoblique Plotter	June 8, 1943
2,362,500	Quenon, Eugene E.	Apparatus for Testing Flame Safety Lamps	Nov. 14, 1944
2,364,088	Miller, Harold C., William B. Berwald, and David Ben Taliaferro, Jr.	Core Drilling	Dec. 5, 1944
2,368,209	Fahey, Jos. J., Michael Fleischer, and William W. Rubey.	Art of Extinguishing Burning Magnesium and the Like.	Jan. 30, 1945
2,370,143	Buckmaster, James L.	Camera Lucida Instrument and Prismatic Unit Therefor.	Feb. 27, 1945
2,439,805	Hanley, Herbert R., and James H. Jacobs.	Method of Electrowinning Manganese	Apr. 20, 1948
2,448,533	Laurance, Harold W.	Consistency Meter	Sept. 7, 1948
2,454,258	Schroeder, Wilburn C., and Abraham A. Berk.	Water Treatment to Prevent Embrittlement Cracking.	Nov. 16, 1948
2,476,309	Lang, Walter B.	Apparatus for Subaqueous Geologic Prospecting.	July 19, 1949
2,548,897	Kroll, William J.	Process for Melting Hafnium, Zirconium, and Titanium Metals.	Apr. 17, 1951
2,595,251	Harrison, Lawrence H.	Short-Circuiting Contractor for Direct-Current Circuits.	May 6, 1952
2,600,436	Shaw, John M., Thomas R. Bartley, and Richard S. Rosenfels.	Method of Killing Submerged Waterweeds	June 17, 1952
2,610,506	Taliaferro, David B., Jr., Clifford E. McClung, and Fritz G. Mueller.	Instrument for Locating the Liquid Level in Wells.	Sept. 16, 1952
2,629,253	Deaton, William M.	Moisture Content Recorder for Gases Under Pressure.	Feb. 24, 1953
2,666,269	Parry, Vernon F.	Method of Drying Solids in a Fluidized Bed	Jan. 19, 1954
2,675,853	Hatch, Robert A., and Jay E. Comeforo.	Fabrication of Synthetic Fluorine-Mica	Apr. 20, 1954
2,696,752	Bean, Russell K.	Stereoscopic Photographic Projection Mapping Instrument.	Dec. 14, 1954
2,711,435	Humphrey, Richard A.	Electric Furnace and Electric Melting and Crystallizing Method for Minerals.	June 21, 1955
2,728,225	Skibitzke, Herbert E.	Thermal Flowmeter	Dec. 27, 1955
2,737,846	Bean, Russell K.	Ellipsoidal Reflector Projector for Stereophotogrammetric Map Plotting.	Mar. 13, 1956
2,763,478	Parry, Vernon F.	Apparatus for Drying Solids in a Fluidized Bed.	Sept. 18, 1956
2,771,686	Hamontre, Hugh C., Frederick E., Armstrong, and Fritz G. Mueller.	Instrument to Measure the Diameter of Subsurface Well Bores.	Nov. 27, 1956
2,821,499	Applegate, Vernon C., and John H. Howell.	Method for Controlling Sea Lampreys (Petromyzon Marinus).	Jan. 28, 1958
2,826,897	Vinsonhaler, Russell, Daniel W. Bates, and George O. Black.	Fish Diversion Louver System	Mar. 18, 1958
2,829,061	Comeforo, Jay E., and Robert A. Hatch.	Machinable Ceramic Bonded Material and Method for Producing Same.	Apr. 1, 1958

Partial list of patents held by the Department of the Interior—Continued

Patent No.	Inventor(s)	Title	Date issued
2,882,328	Worden, Edgar C	Controller for Regulating the Resistance of a Melt.	Apr. 14, 1959
2,869,419	Bean, Russell K	Orthophotoscope	Jan. 20, 1959
2,886,405	Benson, Homer E., and Jos. H. Field.	Method for Separating CO_2 and H_2S from Gas Mixtures.	May 12, 1959
2,889,528	Monfore, Gervaise E	Standardizing Strain Gage	June 2, 1959
2,913,846	McLain, Alberton L	Apparatus for Controlling the Upstream Movement of Fish.	Nov. 24, 1959
2,947,688	Murphy, George W	Process and Apparatus for the Demineralization of Saline Water.	Aug. 2, 1960
2,968,869	Scher, Marvin B	Preparation of Maps	Jan. 24, 1961
2,979,442	Badger, Walter L	Process for the Prevention of Scale in Sea Water Evaporators.	Apr. 11, 1961
2,983,810	James, Robert S., and Joseph J. Seman.	Photoflash Unit	May 9, 1961
2,991,421	Volz, Charles D	Fish Guidance Direct Current Devices	July 4, 1961
2,992,884	Bienstock, Daniel, and Joseph M. Field.	Process for Removal of Sulfur Oxide From Gases.	July 18, 1961
2,996,292	Graf, Ernst G., and Charles N. Howard.	Gravity Feed Combustion Equipment Applying Crossfeed Ignition Principle.	Aug. 15, 1961
2,996,439	Glover, Robert E	Rotary Still	Do.
3,002,002	Wender, Irving, and Milton Orchin.	Reduction of the Thiophene Nucleus	Sept. 26, 1961
3,002,091	Armstrong, Frederick, E	Method of Tracing the Flow of Liquids by the use of Post Radioactivation of Tracer Solutions.	Do.
3,005,690	Praskey, Charles, and Willard S. Swanson.	Multiple Compartment Rotary Drum for the Leaching of Ores or Related Products in a Continuous Countercurrent system.	Oct. 24, 1961
3,008,802	Hatch, Robert A., and Haskiel R. Shell.	Recrystallizing a Reconstituted Fluorine-Mica Sheet.	Nov. 14, 1961
3,010,208	Friedman, Irving and Robert L. Smith.	Method for Determining the Authenticity of Ancient Artifacts Made of Obsidian.	Nov. 28, 1961
3,012,668	Fraas, Foster	Electrostatic Separation Carrier Electrode	Dec. 12, 1961
3,016,296	Wong, Morton M., and Ernst K. Kleespies.	Method for Reduction of Refractory Metal Oxide to Metal by Calcium Carbide.	Jan. 9, 1962
3,022,842	Mafrica, Leo	Automatic Batch Weighing Device for Filling or Unloading.	Feb. 27, 1962
3,027,750	Frande, L. Warren, Lowell Stroud, and William Deaton.	Apparatus for Studying Phase Relationships of Gases and Gas Mixtures.	Apr. 3, 1962
3,028,183	Phillips, Werner A	Sealed Ball Joint for Electrodes	Do.
3,031,287	Benson, Homer E., and Joseph H. Field.	Process for Manufacturing Mixtures of Hydrogen, Carbon Monoxide, and Methane.	Apr. 24, 1962

CANADIAN PATENTS

600,326	Applegate, Vernon C., and John H. Howell.	Method for Controlling Petromyzon Marinus	June 21, 1960
620,410	McLain, Alberton L	Apparatus for Controlling the Upstream Movement of Fish.	May 16, 1961

APPENDIX B

Licenses granted under Department of the Interior patents

Patent No.	Title	Licensee	Date issued
2,118,829	Preparation of Cobalt-Copper Catalysts.	Diamond-Harshaw Co., Cleveland, Ohio	Aug. 9, 1946
2,119,560	Electrolytic Process for the Extraction of Metallic Manganese.	Great Western Electro-Chemical Co., San Francisco, Calif.	June 25, 1938
2,215,484	Sonic Fluocculator and Method of Fluocculating Smoke or the Like.	Ultrasonic Corp., 883 Boylston St., Boston, Mass.	Sept. 10, 1946
2,283,954	Apparatus for Testing the Embrittlement Cracking Characteristics of Solutions.	National Aluminate Corp.	May 15, 1943
2,283,954	do	W. H. & L. D. Betz Co., Danville, Ill.	Mar. 19, 1943
2,283,954	do	Gilbert Associates, Inc., 412 Washington St., Reading, Pa.	Feb. 20, 1943
2,283,954	do	Cyrus Wm. Rice & Co., Inc., East Orange, N.J.	Do.
2,283,954	do	Hagan Corp. and its subsidiaries; Hall Laboratories, Inc.; The Buromin Co.; Calgon, Inc., Hagan Bldg., 323 4th Ave., Pittsburgh, Pa.	Jan. 8, 1943
2,283,954	do	Graver Tank & Manufacturing Co., Inc., East Chicago, Ind.	Sept. 20, 1944
2,283,954	do	Stout Engineering Co., Post Office Box 1453, Reading, Pa.	May 15, 1952
2,283,955	Means for and Method of Testing Embrittlement Cracking Characteristics of Solutions.	The Detroit Edison Co., Detroit, Mich.	Nov. 30, 1942
2,283,955	do	National Aluminate Corp., Chicago, Ill.	May 15, 1943
2,283,955	do	W. H. & L. D. Betz Co., Danville, Ill.	Mar. 19, 1943
2,283,955	do	Gilbert Associates, Inc., 412 Washington St., Reading, Pa.	Feb. 20, 1943
2,283,955	do	Cyrus Wm. Rice & Co., Inc., East Orange, N.J.	Do.
2,283,955	do	Port Huron Sulphite & Paper Co., Port Huron, Mich.	Jan. 28, 1943
2,283,955	do	Hagan Corp. & subsidiaries: Hall Laboratories, Inc.; The Buromin Co.; Calgon, Inc.; Hagan Bldg., 323 4th Ave., Pittsburgh, Pa.	Jan. 8, 1943
2,283,955	do	Graver Tank & Manufacturing Co., Inc., East Chicago, Ind.	Sept. 20, 1944
2,283,955	do	American Die & Tool Co., Reading, Pa.	Apr. 11, 1945
2,283,955	do	Stout Engineering Co., Post Office Box 1453, Reading, Pa.	May 15, 1952
2,294,532	Method and Means for Extinguishing Burning Molten Magnesium and the Like.	Clinchfield Sand & Feldspar Corp., 618 Mercantile Trust Bldg., Baltimore, Md	Aug. 20, 1942
2,294,532	do	M. A. Boardman, Incend-X Co., Philadelphia, Pa.	Sept. —, 1942
2,294,532	do	The Detroit Edison Co., Detroit, Mich.	Nov. 30, 1942
2,294,532	do	Texas Mica & Feldspar Co., Van Horn, Tex.	Mar. 4, 1943
2,297,670	Method of Protecting Boilers and the Like Against Embrittlement.	The Detroit Edison Co., Detroit, Mich.	Nov. 30, 1942
2,297,670	do	National Aluminate Corp., Chicago, Ill.	May 15, 1943
2,297,670	do	W. H. & D. L. Betz Co., Danville, Ill.	Mar. 19, 1943
2,297,670	do	Gilbert Associates, Inc., 412 Washington St., Reading, Pa.	Feb. 20, 1943
2,297,670	do	Cyrus Wm. Rice & Co., Inc., East Orange, N.J.	Do.
2,297,670	do	Port Huron Sulphite & Paper Co., Port Huron, Mich.	Jan. 28, 1943
2,297,670	do	Hagan Corp. and subsidiaries; Hall Laboratories, Inc.; the Buromin Co.; Calgon, Inc.; Hagan Bldg., 323 4th Ave., Pittsburgh, Pa.	Jan. 8, 1943
2,297,670	do	Allis-Chalmers Manufacturing Co., Inc., East Chicago, Ill.	Aug. 1, 1945
2,297,670	do	American Die & Tool Co., Reading, Pa.	Apr 11, 1945
2,297,670	do	Graver Tank & Manufacturing Co., Inc., East Chicago, Ind.	Sept. 3, 1946
2,297,689	Separation of Feldspar from Quartz.	Allied Chemical & Dye Corp., 61 Broadway, New York, N.Y.	Jan. 19, 1949
2,346,661	Estimating Molybdenum Content of Scheelite or Calcium Tungstate by Visual Color of its Fluorescence.	Ultra-Violet Products, Inc., Los Angeles, Calif.	Jan. 15, 1943

Licenses granted under Department of the Interior patents—Continued

Patent No.	Title	Licensee	Date issued
2,362,500	Apparatus for Testing Flame Safety Lamps.	Mine Safety Appliances Co., Pittsburgh, Pa.	Mar. 16, 1945
2,362,500	do	Koehler Manufacturing Co., Inc., Marlboro, Mass.	Dec. 7, 1945
2,364,088	Core Drill	George A. Macready, 235 North Freeman Pl., Inglewood, Calif.	Apr. 15, 1955
2,407,651	Concentrating Fluorspar by Froth Flotation.	Ozark-Mahoning Co., Tulsa, Okla.	Dec. 17, 1946
2,418,821	Plural Stage Hydraulic Classifier.	The Deister Concentrator Co., Fort Wayne, Ind.	Dec. 26, 1947
2,448,533	Consistency Meter	The T. L. Smith Co., 2835 North 32d St., Milwaukee, Wis.	Sept. 23, 1949
2,454,258	Water Treatment to Prevent Embrittlement Cracking.	Hall Laboratories, Inc., Pittsburgh, Pa.	Sept. 28, 1949
2,454,258	do	Elgin Softener Corp., Elgin, Ill.	June 24, 1949
2,454,258	do	Allis-Chalmers Manufacturing Co., 1126 South 70th St., Milwaukee, Wis.	Feb. 15, 1952
2,497,863	Method of Concentrating Fluorspar Ores.	Ozark-Mahoning Co., Tulsa, Okla.	Oct. 30, 1950
2,595,251	Short-Circuiting Contractor for Direct-Current Circuits.	Rankin Engine & Machine Co., 917 South 22d St., Birmingham, Ala.	Apr. 25, 1954
2,600,436	Method of Killing Submerged Waterweeds.	Chemical Weed Control Co., 1016 Kains Ave., Berkeley, Calif.	Oct. 18, 1948
2,600,436	do	Wasatch Chemical Co., 2225 South 5th East, Salt Lake City, Utah.	Nov. 1, 1948
2,600,436	do	The Denver Fire Clay Co., Post Office Box 5510, Denver, Colo.	Oct. 20, 1948
2,600,436	do	Fine Organics, Inc., 211 East 19th St., New York, N.Y.	June 14, 1949
2,600,436	do	Inter-Coastal Paint Corp., 2411 Washington Ave., San Leandro, Calif.	Apr. 11, 1950
2,610,506	Instrument for Locating the Liquid Level in Wells.	Quaker State Oil Refining Corp., Post Office Box 337, Bradford, Pa.	Sept. 23, 1954
2,610,506	do	Lynch Oil Co., 617 Court Bldg., Evansville, Ind.	May 24, 1954
2,629,253	Moisture Content Recorder for Gases Under Pressure.	Refinery Manufacturing Co. (now Chandler Engineering Co.), 320 South Kenosha, Tulsa, Okla.	May 20, 1953
2,648,897	Processes for Melting Hafnium, Zirconium, and Titanium Metals.	Rem-Cru Titanium, Inc., 1241 Main St., Bridgeport, Conn.	June 14, 1951
2,666,269	Method of Drying Solids in a Fluidized Bed.	Silver Engineering Works, Inc., 3309 Blake St., Denver, Colo.	Oct. 11, 1951
2,666,269	Continuous Process for Devolatilization of Carbonaceous Materials and Apparatus Therefor.	Roberts & Schaefer Co., 130 North Wells St., Chicago, Ill.	Oct. 16, 1951
2,666,587	Beneficiation of Beryllium Ores by Froth Flotation.	Northwest Defense Minerals, Inc., Keystone, S. Dak.	Mar. 23, 1961
2,675,853	Fabrication of Synthetic Fluorine Micas.	Loesch, Inc., Vestal, N.Y.	July 6, 1956
2,696,752	Stereoscopic Photographic Projection Mapping Instrument.	Bausch & Lomb Optical Co., Rochester, N.Y.	Apr. 14, 1955
2,728,225	Thermal Flowmeter	Well Instrument Development Co., Post Office Box 282, Bellaire, Tex.	Nov. 13, 1956
2,728,225	do	Mandrel Industries, Inc., Houston, Tex.	Dec. 16, 1960
2,737,846	Ellipsoidal Reflector Projector for Stereophotogrammetric Map Plotting.	Bausch & Lomb Optical Co., Rochester, N.Y.	Apr. 30, 1956
2,737,846	do	Wild Heerbrugg Instruments, Ltd., Heerbrugg, Switzerland.	Mar. 11, 1959
2,771,686	An Instrument to Measure the Diameter of Subsurface Well Bores.	Lane-Wells Co., 5610 South Soto St., Huntington Park, Calif.	June 22, 1955
2,771,686	do	Lynch Oil Co., 617 Court Bldg., Evansville, Ind.	May 24, 1955
2,771,686	do	The Western Co., Post Office Box 310, Midland, Tex.	Mar. 31, 1955
2,771,686	do	Great Lakes Petroleum Services, Inc., 1204 Prudential Bldg., Houston, Tex.	Jan. 4, 1956
2,771,686	do	Geo. E. Failing Co., Enid, Okla.	May 27, 1957
2,771,686	do	Magnolia Petroleum Co., Magnolia Bldg., Box 900, Dallas, Tex.	Dec. 16, 1953
2,826,897	Fish Diversion Louver System.	Ideal Cement Co., San Francisco, Calif.	Dec. 19, 1955
2,869,419	Orthophotoscope	Reed Research, Inc., Washington, D.C.	Aug. 29, 1958
2,869,419	do	Wild Heerbrugg Instruments, Ltd., Heerbrugg, Switzerland.	Mar. 11, 1959

Licenses granted under Department of the Interior patents—Continued

Patent No.	Title	Licensee	Date issued
2,886,405	Method for Separating CO_2 and H_2S from Gas Mixtures.	Lone Star Producing Co., Dallas, Tex	Aug. 13, 1959
2,886,405	do	Monsanto Chemical Co., St. Louis, Mo	July 28, 1959
2,886,405	do	St. Paul Ammonia Co., St. Paul, Minn	July 2, 1956
2,886,405	do	Southern Nitrogen Co., 60 East 42d St., New York, N.Y.	Oct. 21, 1955
2,889,528	Standardizing Strain Gage	G. E. Monfore, 120 North Elmhurst Ave., Mount Prospect, Ill.	Sept. 17, 1959
3,005,690	Multiple Compartment Rotary Drum for the Leaching of Ores or Related Products in a Continuous Countercurrent System.	Sterling Carger Co., Mercer Caverns, Murphys, Calif.	Mar. 30, 1962
	CANADIAN APPLICATIONS		
SN652,316	Method of Controlling Petromyzon Marinus (FWS-313A).	Dow Chemical Co., Midland, Mich	Oct. 10, 1958
SN726,021	Method of Controlling Petromyzon Marinus (313-FWS).	do	Oct. 8, 1958
SN795,298	Apparatus for Studying Phase Relationships of Gases and Gas Mixtures.	National Distillers & Chemical Corp., New York, N.Y.	July 15, 1960
SN747,676	Method for Controlling Petromyzon Marinus.	Dow Chemical Co., Midland, Mich	Aug. 20, 1959
SN753,927	Method for Controlling Sea Lamprey With Halogen Mono-Nitrophenols.	do	Do.

Appendix C

Time Magazine Article July 13, 1962 (P. 46), Relating to Lamprey Larvicide Compound

VICTORY ON THE LAKES

The bitter battle of the Great Lakes has been going on for 40 years, and for 40 years, from Erie to Superior, an ugly bloodsucking monster has been winning. Chief losers have been the splendid lake trout—even though man himself has been their ally. But now news has come at last that the monsters are being beaten: a subtle chemical, cleverly used, has almost cleared Lake Superior of the invading fish-killing sea lamprey.

In its native ocean the sea lamprey is not particularly numerous, but ever since it appeared in Lake Erie in 1921, having worked its way up the Welland Canal past Niagara Falls, the repulsive eellike creature has been swarming in the lakes. With its round, suckerlike mouth lined with concentric rows of small, sharp teeth, it makes its living by attaching itself to the side of an unlucky fish. Its teeth rasp a hole; its powerful saliva corrodes the fish's flesh and keeps its blood flowing freely. Many fish die of a single lamprey attack.

Lively larva.—Lampreys prefer the larger fish, especially the tasty lake trout, which are also favorites of human gourmets. Lake by lake, as the lampreys advanced the trout disappeared. In 1935 the Lake Huron commercial catch was 6 million pounds; by 1945 it had

dropped below 1 million pounds. Later it fell to almost nothing. In Lake Michigan the story was the same. In Lake Superior, last lake to be invaded, the trout catch fell from 4,500,000 pounds in 1951 to 368,000 pounds in 1961.

First countermeasure tried by the fishes' human allies was electrical barriers across stream mouths to keep mature lampreys from swimming upstream to spawn. But many streams were already packed with growing larvae from lamprey eggs, so the U.S. Fish and Wildlife Service and the Canadian Department of Fisheries decided to destroy the larvae themselves. In search of a selective lamprey-larva poison, they tried more than 6,000 different chemicals on jars containing 2 lamprey larvae, 2 bluegill fingerlings, and 2 small rainbow trout. Some chemicals killed nothing; some killed both larvae and fish. Some killed two of the fish and one larva. Finally, in 1955, Chief John Howell, of the Service's Hammond Bay, Mich., lab, found a jar with its two larvae dead and its four little fish alive and frisky. The tricky compound that did the job best was 3-trifluormethyl-4-nitrophenol—more handily known as TFM. Developed by Government Biologist Vernon Applegate, TFM reaches into the mud and attacks lamprey larvae. Millions of them pop out of their burrows and writhe helplessly for hours before they die.

Confident Service.—TFM was first used in 1958 on lamprey-spawning streams that flow into Lake Superior, and by last spring the tide had turned against the slimy invaders. The number caught in traps as they tried to swim upstream fell to 12 percent of the 1961 catch. The adults are apparently dying off and are not being replaced by adolescent larvae.

The battle of the lakes is far from over, but the Fish and Wildlife Service is now hopeful of eventual victory. It has already started TFM treatment in streams that flow into Lake Michigan and Huron. As soon as each lake is reasonably safe, the Service will release baby trout, confident that most of them will not be sucked to death by lampreys.

APPENDIX D

DEPARTMENT OF THE INTERIOR EMPLOYEES INVENTION REGULATIONS

UNITED STATES DEPARTMENT OF THE INTERIOR

OFFICE OF THE SECRETARY

CODE OF FEDERAL REGULATIONS

TITLE 43—PUBLIC LANDS: INTERIOR

SUBTITLE A—OFFICE OF THE SECRETARY OF THE INTERIOR

PART 6—PATENT REGULATIONS

Sec.

SUBPART A—INVENTIONS BY EMPLOYEES

6.1 Definitions.
6.2 Report of invention.
6.3 Action by supervisory officials.
6.4 Action by Solicitor.
6.5 Rights in inventions made before January 23, 1950.
6.6 Rights in inventions made on or after January 23, 1950.
6.7 Appeal by employee.
6.8 Domestic patent protection.
6.9 Foreign patent protection.
6.10 Publication and public use of invention before patent application is filed.
6.11 Publicity concerning invention after patent application is filed.
6.12 Condition of employment.

Subpart A is amended so as to read as follows:

§ 6.1 *Definitions.* As used in this subpart:

(a) The term "Department" means the Department of the Interior.

(b) The term "Secretary" means the Secretary of the Interior.

(c) The term "Solicitor" means the Solicitor of the Department of the Interior.

(d) The term "Chairman" means the Chairman of the Government Patents Board.*

(e) The term "invention" means any art, machine, manufacture, design, or composition of matter, or any new and useful improvement thereof, or any variety of plant, which is or may be patentable under the patent laws of the United States.

(f) The term "employee" includes a part-time consultant or a part-time employee of the Department in so far as inventions made during periods of official duty are concerned, except when special circumstances in a specific case require an exemption in order to meet the needs of the Department, each such exemption to be subject to the approval of the Chairman.

§ 6.2 *Report of invention.* (a) Every invention made by an employee of the Department shall be reported by such employee through his supervisor and the head of the bureau or office to the Solicitor, unless the invention obviously is unpatentable. If the invention is the result of group work, the report shall be made by the supervisor and shall be signed by all employees participating in the making of the invention. The original and three copies of the invention report shall be furnished to the Solicitor. The Solicitor may prescribe the form of the report.

*The Government Patents Board has been abolished by Executive Order 10930, Mar. 24, 1961, 26 F.R. 2583. Its functions and that of its Chairman have been transferred to the Commissioner of Patents, 26 F.R. 3118.

(b) The report shall be made as promptly as possible, taking into consideration such factors as possible publication or public use, reduction to practice, and the necessity for protecting any rights of the Government in the invention. Although it is not necessary to withhold the report until the process or device is completely reduced to practice, reduction to practice assists in the preparation of a patent application and, if diligently pursued, protects the interests of the Government and of the inventor. If an invention is reduced to practice after the invention report is filed, the Solicitor must be notified forthwith.

(c) For the protection of the rights of the Government and of the inventor, invention reports and memoranda or correspondence concerning them are to be considered as confidential documents.

(d) An invention report shall contain the following information:

(1) the title of the invention;

(2) the full name, residence, office address, bureau or office and division, position or title, and official working place of the inventor;

(3) a statement of the evidence that is available as to the making of the invention, including information relative to conception, disclosure to others, and reduction to practice;

(4) information concerning any publication or public use of the invention;

(5) the problems which led to the making of the invention;

(6) the objects, advantages, and uses of the invention;

(7) a description of the invention;

(8) experimental data;

(9) information which the inventor may have obtained as to the prior art;

(10) the inventor's opinion as to the foreign countries in which the invention would be most useful and would have the greatest commercial value;

(11) either a statement that the employee is willing to assign the rights in the invention to the Government, or a request pursuant to paragraph (e) of this section for a determination of the respective rights of the Government and of the inventor.

(e) If the inventor believes that he is not required by the regulations in this subpart to assign to the Government the entire domestic right, title, and interest in and to the invention, and if he is unwilling to make such an assignment to the Government, he shall, in his invention report, request that the Solicitor determine the respective rights of the Government and of the inventor in the invention, and he shall include in his invention report information on the following points, in addition to the data called for in paragraph (d) of this section:

(1) the circumstances under which the invention was made and developed;

(2) the employee's official duties, as given on his job sheet or otherwise assigned, at the time of the making of the invention;

(3) whether the employee wishes a patent application to be prosecuted under the act of March 3, 1883, as amended (35 U.S.C., 1946 ed., sec. 45), if it should be determined that he is not required to assign all domestic rights in the invention to the Government; and

(4) whether the employee would be willing, upon request voluntarily to assign foreign rights in the invention to the Govern-

ment if it should be determined that an assignment of such rights to the Government is not required.

§ 6.3 *Action by supervisory officials.* (a) The preparation of an invention report and other official correspondence on patent matters is one of the regular duties of an employee who has made an invention, and the supervisor of such employee shall see that he is allowed sufficient time from his other duties to prepare such documents. The supervisor shall ascertain that the invention report and other papers are prepared in conformity with these regulations; and, before transmitting the invention report to the head of the bureau or office, shall check its accuracy and completeness, especially with respect to the circumstances in which the invention was developed, and shall add whatever comments he may deem to be necessary or desirable. The supervisor shall add to the file whatever information he may have concerning the governmental and commercial value of the invention, and the foreign countries in which it is likely that the invention would be most useful and would have the greatest commercial value.

(b) The head of the bureau or office shall make certain that the invention report is as complete as circumstances permit. He shall provide whatever information may be available in his agency concerning the governmental and commercial value of the invention, and the foreign countries in which it is likely that the invention would be most useful and would have the greatest commercial value.

(c) If the employee inventor requests that the Solicitor determine his rights in the invention, the head of the bureau or office shall state his conclusions with respect to such rights.

(d) The head of the bureau or office shall indicate whether, in his judgment, the invention is liable to be used in the public interest, and he shall set out the facts supporting his conclusion whenever the employee's invention report does not contain sufficient information on this point.

§ 6.4 *Action by Solicitor.* (a) If an employee inventor requests, pursuant to paragraph (e) of section 6.2, that such determination be made, the Solicitor shall determine the respective rights of the employee and of the Government in and to the invention. The Solicitor's determination respecting an invention made before January 23, 1950, shall be final; but his determination respecting an invention made on or after January 23, 1950, shall be subject to review by the Chairman in proper cases under Executive Order 10096 and the rules and regulations issued by the Chairman with the approval of the President.

(b) If the Government is entitled to obtain the entire domestic right, title, and interest in and to an invention made by an employee of the Department, the Solicitor, subject to review by the Chairman in proper cases, may take such action respecting the invention as he deems necessary or advisable to protect the interests of the United States.

§ 6.5 *Rights in inventions made before January 23, 1950.* (a) The provisions of this section shall be applied in determining the respective rights of the Government and of an employee of the Department in and to any invention made by the employee prior to January 23, 1950.

(b) Each employee of the Department is required, upon request, to assign to the United States, as represented by the Secretary, all domestic and foreign rights to any invention made by the employee within the general scope of his governmental duties, unless such

requirement is waived in writing by the Solicitor. An invention will be considered as having been made within the general scope of the governmental duties of an employee (1) whenever his duties include research or investigation, or the supervision of research or investigation, and the invention arose in the course of such research or investigation and is relevant to the general field of an inquiry to which the employee was assigned, or (2) whenever the invention was in a substantial degree made or developed through the use of Government facilities or financing, or on Government time, or through the aid of Government information not available to the public.

(c) An employee of the Department is entitled to all rights resulting from any invention which was made by him outside the general scope of his governmental duties, as defined in paragraph (b) of this section.

(d) If the Solicitor finds that an invention made by an employee of the Department outside the general scope of his governmental duties is used or liable to be used in the public interest, and executes a certificate to that effect, the employee may, if he wishes to do so, request that an application for a patent be filed and prosecuted at the expense of the Government under the act of March 3, 1883, as amended (35 U.S.C., 1946 ed., sec. 45). Under such circumstances, the invention may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty.

(e) The requirement relative to the assignment of domestic patent rights to the United States, set forth in paragraph (b) of this section, may be waived in whole or in part, in writing, by the Solicitor in the case of any invention as to which he finds, upon grounds to be specified by him, that the interests of the United States do not require the full assignment of such rights.

(f) The requirement relative to the assignment of foreign patent rights to the United States, set forth in paragraph (b) of this section, may be waived in whole or in part, in writing, by the Solicitor if a determination is made by competent authority pursuant to section 3 of Executive Order No. 9865 (12 F.R. 3907) that no foreign patent protection shall be procured by the Government as to an invention or that foreign patent protection shall be procured by the Government only in specified foreign jurisdictions. An employee of the Department shall not file in any foreign jurisdiction any patent application relating to an invention made within the general scope of his governmental duties unless the Solicitor has waived in writing the requirement that foreign rights be assigned to the United States.

§ 6.6 *Rights in inventions made on or after January 23, 1950.* (a) The rules prescribed in this section shall be applied in determining the respective rights of the Government and of an employee of the Department in and to any invention made by the employee on or after January 23, 1950.

(b)(1) Except as indicated in the succeeding subparagraphs of this paragraph, the Government shall obtain the entire domestic right, title, and interest in and to any invention made by an employee of the Department (i) during working hours, or (ii) with a contribution by the Government of facilities, equipment, materials, funds, or information, or of time or services of other Government employees on official duty, or (iii) which bears a direct relation to or is made in consequence of the official duties of the inventor.

(2) In any case where the contribution of the Government, as measured by any one or more of the criteria set forth in subparagraph (1) of this paragraph, to the invention is insufficient equitably to justify a requirement of assignment to the Government of the entire domestic right, title, and interest in and to such invention, or in any case where the Government has insufficient interest in an invention to obtain the entire domestic right, title, and interest therein (although the Government could obtain same under subparagraph (1) above), the Solicitor, subject to the approval of the Chairman, shall leave title to such invetion in the employee, subject, however, to the reservation to the Government of a nonexclusive, irrevocable, royalty-free license in the invention with power to grant licenses for all governmental purposes, such reservation, in the terms thereof, to appear, where practicable, in any patent, domestic or foreign, which may issue on such invention.

(3) In applying the provisions of subparagraphs (1) and (2) above to the facts and circumstances relating to the making of any particular invention, it shall be presumed that any invention made by an employee who is employed or assigned (i) to invent or improve or perfect any art, machine, manufacture, or composition of matter, or (ii) to conduct or perform research, development work, or both, or (iii) to supervise, direct, coordinate, or review Government financed or conducted research, development work, or both, or (iv) to act in a liaison capacity among governmental or nongovernmental agencies or individuals engaged in such work, falls within the provisions of subparagraph (1) above, and it shall be presumed that any invention made by any other employee falls within the provisions of subparagraph (2) above. Either presumption may be rebutted by the facts or circumstances attendant upon the conditions under which any particular invention is made and, notwithstanding the foregoing, shall not preclude a determination that the invention falls within the provisions of subparagraph (4) next below.

(4) In any case wherein the Government neither (i) obtains the entire domestic right, title, and interest in and to an invention pursuant to the provisions of subparagraph (1) above, nor (ii) reserves a nonexclusive, irrevocable, royalty-free license in the invention, with power to grant licenses for all governmental purposes, pursuant to the provisions of subparagraph (2) above, the Solicitor, subject to the approval of the Chairman, shall leave the entire right, title, and interest in and to the invention in the employee, subject to law.

(c) In the event that the Solicitor determines, pursuant to subparagraph (2) or subparagraph (4) of paragraph (b) of this section, that title to an invention will be left with an employee, the Solicitor shall, subject to considerations of national security, or public health safety, or welfare, report to the Chairman, promptly upon making such determination, the following information concerning the invention:

(1) description of the invention in sufficient detail to permit a satisfactory review;

(2) name of inventor and his employment status; and

(3) statement of the Solicitor's determination and reasons therefor.

The report in a case falling within the provisions of subparagraph (2) of paragraph (b) shall be made after the expiration of the period

prescribed in section 6.7 for the taking of an appeal, or it may be made prior to the expiration of such period if the employee acquiesces in the Solicitor's determination. The Chairman thereupon will review the determination of the Solicitor, and his decision respecting the matter shall be final, subject to the right of the inventor to submit to the Chairman, within 30 days (or such longer period as the Chairman may, for good cause, fix in any case) after receiving notice of such decision, a petition for the reconsideration of the decision if it gives to the Government greater rights than the Solicitor's determination. A copy of any such petition must also be filed by the inventor with the Solicitor within the prescribed period.

§ 6.7 *Appeal by employee.* (a) Any employee who is aggrieved by a determination of the Solicitor pursuant to subparagraph (1) or subparagraph (2) of paragraph (b) of section 6.6 may obtain a review of the determination by filing, within 30 days (or such longer period as the Chairman may, for good cause, fix in any case) after receiving notice of such determination, a written appeal with the Chairman and a copy of the appeal with the Solicitor.

(b) In the event of the filing of an appeal pursuant to this section, the Solicitor shall, subject to considerations of national security, or public health, safety, or welfare, furnish the Chairman in writing, promptly upon the filing of the appeal, the following information concerning the invention involved in the appeal:

(1) description of the invention in sufficient detail to permit a satisfactory review;

(2) name of the inventor and his employment status, including a detailed statement of his official duties and responsibilities at the time of making the invention; and

(3) detailed statement of the nature of the dispute or controversy, together with copies of the Solicitor's determination, of any briefs or written arguments that may have been filed, of any statements or other evidence that may have been considered by the Solicitor, and of other relevant material.

(c) The decision of the Chairman upon any appeal taken pursuant to this section shall be final.

§ 6.8 *Domestic patent protection.* (a) The Solicitor, upon determining that an invention coming within the scope of subparagraph (1) or subparagraph (2) of paragraph (b) of section 6.6 has been made, shall thereupon determine whether patent protection will be sought in the United States by the Department for such invention. A controversy over the respective rights of the Government and of the inventor in any case shall not delay the taking of the actions provided for in this section. In cases coming within the scope of subparagraph (2) of paragraph (b) of section 6.6, action by the Department looking toward such patent protection shall be contingent upon the consent of the inventor.

(b) Where there is a dispute as to whether subparagraph (1) or subparagraph (2) of paragraph (b) of section 6.6 applies in determining the respective rights of the Government and of an employee in and to any invention, the Solicitor will determine whether patent protection will be sought in the United States pending the Chairman's decision on the dispute, and, if he determines that an application for patent should be filed, he will take such rights as are specified in subparagraph (2) of paragraph (b) of section 6.6, but this shall be

without prejudice to acquiring the rights specified in subparagraph (1) of that paragraph should the Chairman so decide.

(c) Where the Solicitor has determined to leave title to an invention with an employee under subparagraph (2) of paragraph (b) of section 6.6, the Solicitor will, upon the filing of an application for patent and pending review of the determination by the Chairman, take the rights specified in that subparagraph, without prejudice to the subsequent acquisition by the Government of the rights specified in subparagraph (1) of paragraph (b) of section 6.6 should the Chairman so decide.

(d) In the event that patent protection is sought by the Department for an invention made by a Government employee, the Solicitor shall, subject to considerations of national security, or public health, safety, or welfare, report to the Chairman, promptly upon the filing of an application for patent, the following information concerning the invention:

(1) brief description of the invention;

(2) name of the inventor and his employment status; and

(3) serial number, title of invention, and date on which the application was filed.

(e) In the event that the Solicitor determines that an application for patent will not be filed on an invention made under the circumstances specified in subparagraph (1) of paragraph (b) of section 6.6, giving the United States the right to title thereto, the Solicitor shall, subject to considerations of national security, or public health, safety, or welfare, report to the Chairman, promptly upon making such determination, the following information concerning the invention:

(1) description of the invention in sufficient detail to permit a satisfactory review;

(2) name of the inventor and his employment status; and

(3) statement of the Solicitor's determination and reasons therefor.

The Chairman may, if he determines that the interest of the Government so requires and subject to considerations of national security, or public health, safety, or welfare, cause an application for patent to be filed or cause the invention to be fully disclosed by publication thereof.

(f) Whenever a patent hereafter issues on an invention made by an employee of the Department in respect to which the Government has any right, title, or interest, including a license, in and to the invention, the Solicitor shall, promptly upon the issuance of the patent, furnish to the Chairman:

(1) an abstract of the invention;

(2) name of the inventor and his employment status;

(3) a copy of the patent; and

(4) statement of the nature and extent of the right, title, or interest of the Government in the invention.

§ 6.9 *Foreign patent protection.* (a) Immediately upon the filing of an application for United States patent and receiving from the Commissioner of Patents the serial number of such application on an invention in and to which the Government, as represented by the Secretary, has obtained title or the right to file foreign patent applications thereon, or holds an option to obtain such right, the Solicitor shall, in accordance with the procedure prescribed by the Chairman, ascertain whether the United States will seek foreign patent protection

for such invention, and, if so, in what foreign jurisdictions such patent protection will be sought. When the foreign patent rights in an invention made by a Department employee have not been assigned to the Government but the Government may, at its option or on request, acquire such rights, and a decision is made that the Government will not seek a foreign patent in any particular foreign country, the inventor may apply for patent in such country, subject to a nonexclusive, irrevocable, royalty-free license to the Government for governmental purposes.

§ 6.10 *Publication and public use of invention before patent application is filed.* (a) Publication or public use of an invention constitutes a statutory bar to the granting of a patent for the invention unless a patent application is filed within one year of the date of such publication or public use. In order to preserve rights in unpatented inventions, it shall be the duty of the inventor, or of his supervisor if the inventor is not available to make such report, to report forthwith to the Solicitor any publication or use (other than experimental) of an invention, irrespective of whether an invention report has previously been filed. If an invention report has not been filed, such a report, including information conerning the public use or publication, shall be filed at once. If an invention is disclosed to any person who is not employed by the Department or working in cooperation with the Department upon that invention, a record shall be kept of the date and extent of the disclosure, the name and address of the person to whom the disclosure was made, and the purpose of the disclosure.

(b) No description, specification, plan, or drawing of any unpatented invention upon which a patent application is likely to be filed shall be published, nor shall any written description, specification, plan, or drawing of such invention be furnished to anyone other than an employee of the Department or a person working in cooperation with the Department upon that invention, unless the Solicitor is of the opinion that the interests of the Government will not be prejudiced by such action. If any publication disclosing the invention, not previously approved by the Solicitor, comes to the attention of the inventor or his supervisor, it shall be the duty of such person to report such publication to the Solicitor.

§ 6.11 *Publicity concerning the invention after patent application is filed.* In order that the public may obtain the greatest possible benefit from inventions in which the Secretary has transferable interests, inventions assigned to the Secretary upon which patent applications have been filed shall be publicized as widely as possible, within limitations of authority, by the Department, by the originating agency, by the division in which the inventor is employed, and by the inventor himself in his contacts with industries in which the invention is or may be useful. Regular organs of publication shall be utilized to the greatest extent possible. In addition, it shall be the duty of the Solicitor, upon being advised of the issuance of any patent assigned to the Secretary, to take steps towards listing the patent, in the register in the Patent Office established for that purpose, as available for licensing.

§ 6.12 *Condition of employment.* (a) The regulations in this subpart, as were those of Departmental Orders Nos. 1763 (7 F.R. 10161) and 1871 (8 F.R. 12523), as amended (10 F.R. 9722), shall

be a condition of employment of all employees of the Department and shall be effective as to all inventions made during any period of employment since November 17, 1942, except that the provisions relating to foreign patent rights and foreign patent applications shall not apply to inventions which, prior to the effective date of these regulations, have been reported to the Solicitor and upon which foreign patent applications already have been filed in accordance with the provisions of Orders Nos. 1763 and 1871. These regulations shall be effective without regard to any existing or future contracts to the contrary entered into by any employee of the Department with any person other than the Government.

(b) If a patent application is filed upon an invention which has been made by an employee of the Department under circumstances that entitle the Government to the entire domestic right, title, and interest in and to the invention, but which has not been reported to the Solicitor pursuant to the regulations in this subpart, title to such invention shall immediately vest in the Government, as represented by the Secretary, and the contract of employment shall be considered an assignment of such rights.

OSCAR L. CHAPMAN,
Secretary of the Interior.

June 21, 1951

(Issued under 5 U.S.C., 1946 ed., sec. 22; sec. 2, Reorganization Plan No. 3 of 1950, 15 F.R. 3174; Executive Order 10096, 15 F.R. 391.)

APPENDIX E

COOPERATIVE AGREEMENTS CLAUSES

BUREAU OF MINES

A. The Government retains all rights:

(1) The Government hereby notifies the Cooperator that employees of the Department of the Interior and of the Bureau of Mines assigned to any work under this agreement, whether on leave or not, are subject to the patent regulations of the Department of the Interior (43 CFR, subtitle A, pt. 6; 16 F.R. 6181, as amended) relating to inventions of employees of the Department of the Interior; that said regulations, among other things, require such employees to assign to the Government all domestic rights to any invention made by them within the general scope of their governmental duties, and that these duties include duties to which they may be assigned under this agreement.

(2) The Cooperator shall and does hereby transfer and assign to the United States of America, as represented by the Secretary of the Interior, any invention or interest therein which it has or may acquire, arising out of any joint projects upon which the two parties hereto shall agree to work cooperatively; and, upon request, shall make, execute, and deliver to the United States of America, as represented by the Secretary of the Interior, other suitable documents to evidence, preserve and record this assignment; and shall require each of its employees, agents, officers, or students who are assigned to or engage in any cooperative work

under the agreement, to sign an agreement in writing, a signed duplicate of which shall be delivered to the Bureau, which shall contain the following clause: "Any invention of mine or in which I have any interest, arising out of the cooperative work under an assignment between the United States of America and_____ (name of cooperator), dated_____, shall be and is hereby transferred and assigned by me to the United States of America, as represented by the Secretary of the Interior."

B. If the Cooperator is a private industrial or commercial organization, and wishes cross-licensing rights the following is used, with the approval of the Solicitor, Department of the Interior:

(1) The Government hereby notifies the Cooperator that employees of the Department of the Interior and of the Bureau of Mines assigned to any work under this agreement, whether on leave or not, are subject to the patent regulations of the Department of the Interior (43 CFR, subtitle A, pt. 6; 16 F.R. 6181, as amended) relating to inventions of employees of the Department of the Interior; that said regulations, among other things, require such employees to assign to the Government all domestic rights to any invention made by them within the general scope of their governmental duties, and that these duties include duties to which they may be assigned under this agreement.

(2) Each party grants to the other party the right to manufacture and use by and for itself, without the payment of any royalties, any invention made in the course of the cooperative work herein provided for. This right to manufacture and use shall be deemed to include the right to sell the resulting products of such manufacture and use.

(3) The Cooperator agrees to grant nonexclusive and nondiscriminatory licenses, under its patent rights in any invention made by its employees in the course of the cooperative work herein provided for, to any person, upon the payment of a reasonable royalty, who may request such a license unless the parties hereto agree upon such other arrangements as should be deemed more advantageous to the public interest.

(4) Any assignments or conveyance of any rights to any invention or the resulting patent by either party shall be made subject to the conditions of this agreement and each party on request shall make, execute, and deliver to the other party, suitable documents to evidence and preserve its rights. The Cooperator will assign to work on the operations covered by this agreement only employees, officers and agents who execute suitable agreements to make these obligations effective.

FISH AND WILDLIFE SERVICE CONDITIONS FOR A COOPERATIVE SCREENING AND DEVELOPMENT PROGRAM FOR PLANT PROTECTION CHEMICALS

1. Chemicals will be selected by Dow Chemical Co. and submitted to the Denver Wildlife Research Center, Bureau of Sport Fisheries and Wildlife, at Denver, Colo., for test as candidate compounds to fill a research need in the animal damage field.

2. Chemical samples initially will be identified only by code numbers.

3. Chemicals subjected to tests at Denver and found to have no significant utility in solution of the designated problem will remain

unidentified and will not be referred to specifically in publications of the Bureau of Sport Fisheries and Wildlife.

4. Chemicals that in tests at Denver indicate significant practical activity will be identified by chemical structure by Dow on a confidential basis so as to expedite research and development work. The Wildlife Research Center will use its best efforts to keep confidential structural, physical, and chemical characteristics referred to it by Dow Chemical Co., if such information is not in the Center's possession prior to the receipt of the sample, is not then and does not become part of the public knowledge or literature and is not thereafter received from a third party without binder of secrecy. The Center will make timely reports on all laboratory and field tests to Dow which will include copies of original test forms, as well as summaries and comments.

5. Publication of results on chemicals having significant practical activity for a designated problem will be withheld by mutual agreement for as long as 3 years after the first written report following preliminary screening tests disclosing this activity.

6. Results of the tests and reports will be furnished Dow Chemical Co. Such results and reports shall not be used by Dow in a manner as to imply any endorsement of any product by the Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior, or the U.S. Government.

7. All compounds will be handled as highly toxic materials until proven otherwise. It is agreed that Dow Chemical Co. shall in no manner whatsoever be liable for injuries or damage resulting from the Wildlife Research Center's testing activities pursuant to this agreement.

8. During the period of laboratory and field experimentation and the publication of results, the supplier of the compound will not be disclosed to persons outside of the two organizations (i.e., identified with the code designation of the chemical) unless by written mutual consent.

9. (*a*) Where Dow furnishes a compound for screening without any prior knowledge of its probable effect as related to the intended purpose, then the employee of the Bureau who demonstrates such properties shall be considered the inventor of the method or process employing said compounds.

(*b*) When Dow supplies a chemical based on information in its possession, indicates the probable utility of the compound for the intended purpose, and suggests that certain tests be conducted, and the evaluation tests of the Bureau demonstrate such utility, the employee of Dow who suggested the chemical shall be considered the inventor of the method employing said chemical.

(*c*) Where, however, an employee of the Bureau determines critical conditions necessary for effective use of the compound, or formulates a novel composition of matter incorporating said compound, then the Bureau employee shall be either the sole inventor, or a joint inventor, together with an employee of Dow Chemical Co. depending on the particular factual situation. In no case, however, can an employee of the Bureau be considered the inventor of the compound supplied.

(*d*) The U.S. Government and Dow Chemical Co. agree to give each other a nonexclusive, nontransferable, royalty-free license to practice any invention made pursuant to (*a*) and (*b*), or (*c*) above.

10. In the event Dow Chemical Co. elects not to manufacture and/or sell a product deemed practical and effective, and if there is demonstrated need for such a product, Dow will make available for license or sublicense or have licensed or sublicensed on a royalty paying basis another firm acceptable to Dow to manufacture for this purpose and will provide pertinent information currently available to expedite manufacture and sale of the material. In the event the product does not become available through any of these sources, the Government shall have the right on a royalty-free basis to manufacture such chemical, or contract for its manufacture by private suppliers solely for Government use.

11. No Member of or Delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

APPENDIX F

May 7, 1962.

PATENT REQUIREMENTS OF THE COAL RESEARCH ACT, SALINE WATER CONVERSION ACT, AND HELIUM ACT

PATENTS AND COPYRIGHTS—COAL RESEARCH PROGRAM

Section 6 of the Coal Research Act of July 7, 1960 (74 Stat. 337, 30 U.S.C. 666), requires that patents on inventions resulting from Government-financed research and development work under the act be available to the general public without royalty or other restriction.

PATENTS AND COPYRIGHTS—SALINE WATER PROGRAM

Section 4b of the Saline Water Conversion Act of September 22, 1961 (75 Stat. 628, 42 U.S.C. 1954b), requires that patents on inventions resulting from Government-financed research and development work under the act be available to the general public without royalty or other restriction.

PATENTS AND COPYRIGHTS—HELIUM

Section 4 of the Helium Act Amendments of September 13, 1960 (74 Stat. 920, 50 U.S.C. 167b), requires that patents on inventions resulting from Government-financed research and development work under the act be available to the general public without royalty or other restriction.

PATENTS AND COPYRIGHTS—COAL RESEARCH PROGRAM

Section 6 of the Coal Research Act of July 7, 1960 (74 Stat. 337, 30 U.S.C. 666), requires the Secretary to take steps to assure that background patents essential to the practice of patents or the use of processes resulting from research and development contracts issued under the act be available to the general public on reasonable terms.

PATENTS AND COPYRIGHTS—SALINE WATER PROGRAM

Section 4b of the Saline Water Conversion Act of September 22, 1961 (75 Stat. 628, 42 U.S.C. 1954b), requires the Secretary to take steps to assure that background patents essential to the practice of patents or the use of processes resulting from research and development contracts issued under the act be available to the general public on reasonable terms.

PATENTS AND COPYRIGHTS—HELIUM

Section 4 of the Helium Act Amendments of September 13, 1960 (74 Stat. 920, 50 U.S.C. 167b), requires the Secretary to take steps to assure that background patents essential to the practice of patents or the use of processes resulting from research and development contracts issued under the act be available to the general public on reasonable terms.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SOLICITOR,
Washington, D.C.

M–36637.

Memorandum.

To: The Secretary of the Interior.

From: The Solicitor.

Subject: Patent policy on contracts executed under Saline Water Conversion Act, Coal Research and Development Act, and Helium Gas Act.

Research and development contracts are presently being negotiated pursuant to authority in the Saline Water Conversion Act [1] and Coal Research and Development Act.[2] A major issue in the negotiations has been the disposition of patent rights resulting from Government-financed research and of patent rights independently acquired by contractors and essential to the practice of processes to produce fresh water from the sea and to convert coal to gasoline. Some potential contractors under these acts have investments in prior research.[3]

On July 25, 1961, by memorandum entitled "Department Patent Policy on Inventions Made During Work Performed Under Research and Development Contracts," and directed to the heads of bureaus and offices of the Department of the Interior, I stated that it was "the general policy of the Department of the Interior to take title to any invention made by a contractor, except where it would be inequitable for the Department to take title because of substantial independent contributions made to the invention by the contractor." With respect to research conducted under the three acts in the title of this memorandum I stated that "the contractor is also required to grant licenses to the public at reasonable royalties." The memorandum of July 25 set no policy with regard to background patent rights.

Subsequently the Saline Water Conversion Act of September 22, 1961, was enacted. Its legislative history clearly indicates that Con-

[1] Act of Sept. 22, 1961, 75 Stat. 628, 42 U.S.C. 1954.
[2] Act of July 7, 1960, 74 Stat. 336, 30 U.S.C. 661–668.
[3] In the discussion which follows the term "foreground patents" refers to patents resulting from Government-financed research and "background patents," to those acquired and owned by the contractor.

gress intended that patents resulting from Government-financed research be available without royalty or other restriction to the general public. Because the language of the patent provision in the act is nearly identical to the patent provisions in the Coal Research and Helium Gas Acts, I have in this opinion not only considered the effect of the subsequent passage of the Saline Water Act on the validity of the July 25 memorandum, but have also reexamined in greater depth my position on the two earlier acts.[4] These studies of the three acts, their legislative histories, and of Government patent practices have led me to conclude that all research and development contracts made under these acts must provide that foreground patents be available without cost to the public. I also conclude that the law precludes you from contracting on terms which do not assure that background patents, when necessary to the practice of any process wholly or partly developed by research financed under these acts, be available to the public on reasonable terms.

FOREGROUND PATENTS

Section 4b of the Saline Water Act provides that:

"All research within the United States contracted for, sponsored, cosponsored or authorized under authority of this Act, shall be provided for in such manner that all information, uses, products, processes, patents, and other developments resulting from such research developed by Government expenditure will (with such exceptions and limitations, if any, as the Secretary may find to be necessary in the interest of national defense) be available to the general public. This subsection shall not be construed as to deprive the owner of any background patent relating thereto of such rights as he may have thereunder." [5]

Nearly identical provisions are contained in the Coal Research and Helium Gas Acts.[6]

The decisive question is the meaning of "available" as it relates to "patents" resulting from Government-financed research. It has been argued that patents are available if they are available at a reasonable royalty. Close examination of the language of subsection 4(b) set out above indicates that "available" as used in relation to patents means available unconditionally. A patent is a grant of the right to exclude others from making, using, or selling the thing patented.[7] It includes the exclusive right to license others to make, use, or vend it.[8] This right is judicially enforcible by suit (1) to enjoin an infringement and (2) to recover damages by reason of infringement.[9] These remedies reflect the two major benefits deriving from patent ownership: the monopoly or exclusive right, and the right to a royalty or financial compensation for use of the patented item by others.

In essence, then, a patent is a right of exclusion with an ancillary right to compensation for use. Retention of this ancillary right to compensation by a contractor would mean that something less than the patent was being made available to the public. Thus the full

[4] The three patent provisions are in pari materia as will be discussed in more detail later in the opinion. Under the doctrines of pari materia the meaning of a later statute can govern the construction of an earlier statute in pari materia. See note 37 infra.
[5] Sec. 4b, act of Sept. 22, 1961; 75 Stat. 628, 42 U.S.C. 1954b.
[6] 74 Stat. 337, 30 U.S.C. 666; 74 Stat. 920, 50 U.S.C. 167b.
[7] *Patterson* v. *Kentucky*, 97 U.S. 501, 24 L. Ed. 1115 (1897).
[8] *Park-In Theatres* v. *Paramount-Richards Theatres* (D.C. Del.), 81 F. Supp. 466, 472.
[9] 35 U.S.C. 283, 284.

patent would not actually be available unless it were available without restriction.

If Congress had meant to provide that merely the use of the patented invention was to be available to the public, it need not have used the word "patents" in the act. The requirement that "information, uses, products, processes * * *, and other developments" be available would have assured the availability of the use of the patented invention. By including the word "patents," Congress indicated its intention that something more than the use of the invention, to-wit the full patent, should be available to the public.

From the legislative history it is apparent that the words "patent" and "available" were not loosely used here to effect an unintended result. An examination of prevailing patent policies in the executive branch, of the legislative history of the acts, and of other statutes in pari materia indicates that Congress fully intended foreground patents to be available to the general public without restriction.

GOVERNMENT PATENT POLICY

Any inquiry into the meaning of the patent clauses of the Saline Water, Coal Research, and Helium Gas Acts must be set in the context of overall Government patent policy as known to Congress at the time it enacted those statutes. Congress, over the past 2 years, has been conducting a major examination of Government patent policy. Bills were introduced in 1960 by Senator Joseph C. O'Mahoney (S. 3156 and S. 3550) and in 1961 by Senator Russell S. Long (S. 1176) and Senator John L. McClellan (S. 1084) to establish a uniform patent policy with regard to inventions arising out of work financed by the Federal Government. The hearings and studies of the Subcommittee on Patents, Trademarks, and Copyrights of the Senate Committee on the Judiciary have revealed that there are many different patent policies followed by the various governmental departments and agencies.[10]

As stated by Senator Long on the Senate floor, May 3, 1960:

"There is no one Government patent policy. Various Federal agencies and departments have sharply varying policies with regard to taking title to patentable inventions made under research and development contracts with private organizations. The law requires that the Government take title to all inventions resulting from Government-financed research, as in the case of the Atomic Energy Commission, National Aeronautics and Space Administration, and the Department of Agriculture. Congress created this policy by statute. Other policies go to the extreme of automatically giving away all commercial rights to the firm doing research, as in the case of the Department of Defense, the Post Office Department, and the National Science Foundation. This type of policy has been adopted wherever administrative discretion was permitted." [11]

The patent policies followed by the Department of Defense and the Post Office Department are not prescribed by statute. The National Science Foundation, however, operates under a statute

[10] See the preliminary reports of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, U.S. Senate, 85th Cong., 2d sess., pursuant to S. Res. 236, 86th Cong., 1st sess., pursuant to S. Res. 53, 86th Cong., 2d sess., pursuant to S. Res. 240, and 87th Cong., 1st sess., pursuant to S. Res. 55; and hearings of the subcommittee, 86th Cong., 2d sess., pursuant to S. Res. 240 (1960), and 87th Cong., 1st sess., pursuant to S. Res. 55 (1961).

[11] 106 Congressional Record 9216.

requiring that each research contract "contain provisions governing the disposition of inventions produced thereunder in a manner calculated to protect the public interest and the equities of the individual or organization with which the contract or other arrangement is executed. * * *."[12]

The Atomic Energy Act and the Space Act have sections which provide that the Government shall take title to patents on inventions arising from Government contract research. The agency may waive the Government's claim to the invention in such circumstances as the agency deems appropriate[13] or upon a determination "that the interests of the United States will be served thereby."[14]

The Department of Agriculture conducts a number of research programs under various laws. A major program is performed under the Research and Marketing Act of 1946, which provides as follows for the two areas of research authorized by the act:

"Any contracts made pursuant to this authority shall contain requirements making the results of research and investigation available to the public through dedication, assignment to the Government, or such other means as the Secretary shall determine.

* * * * * * *

"Any contract made pursuant to this section shall contain requirements making the result of such research and investigation available to the public by such means as the Secretary of Agriculture shall determine."[15]

These provisions are interpreted as requiring a worldwide assignment to the Government of the patent rights to inventions arising out of contract research.[16] Other research is performed by State agricultural experiment stations, financed in part by Federal funds under the Hatch Act.[17] As the Hatch Act contains no patent policy requirements, the Department allows disposition of proprietary rights in accordance with State law or policy.

The Veterans' Administration is governed in its research in the field of prosthetic devices by a statute providing that "the Administrator *may* make available to any person the results of his research."[18] [Emphasis supplied.]

Pursuant to this provision sometimes the Government takes title, sometimes the contractor. In the latter situation it is provided that the contractor must give a royalty-free license to anyone designated by the Veterans' Administration. In recent testimony, representatives of the Veterans' Administration indicated that no one had ever received a royalty on a patent growing out of one of their contracts, so that there had been no occasion to order a company to issue a royalty-free license. In one instance the VA has executed a contract which allowed the contractor to retain title with a royalty-free license to the Government and no restrictions on licensing to the public.[19]

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[12] 64 Stat. 154, 42 U.S.C. 1871.
[13] 60 Stat. 768, 68 Stat. 944, 42 U.S.C. 2182.
[14] 72 Stat. 435, 42 U.S.C. 2457.
[15] 60 Stat. 1084, 7 U.S.C. 427i(a); 60 Stat. 1090, 7 U.S.C. 1624.
[16] Hearings, 87th Cong., 1st sess., note 10, supra, pt. 2, p. 323, statement of W. D. Maclay, Assistant Administrator, Agricultural Research Service (1961).
[17] 24 Stat. 440, 69 Stat. 671, 7 U.S.C. 361, et seq.
[18] 72 Stat. 1116, 38 U.S.C. 216.
[19] Hearings before the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, U.S. Senate, on S. 3156 and S. 3550, 86th Cong., 2d sess., pp. 106–121, and exhibit No. 6 thereto (1960).

The Department of Health, Education, and Welfare is governed by no statutory provisions on patent policy. It has generally, though, followed a policy of taking title to patents arising from Government-financed research with two exceptions. Grants to or contracts with nonprofit institutions allow the institutions to retain patent rights so long as they are made available to the public without unreasonable restrictions or excessive royalties. In cancer chemotherapy industrial research contracts however, provision has been made to leave title with the contractors because contractors claimed a strong background position and demanded title as a price of their participation. The Government retains march-in rights in the event that the contractor does not make the invention available in adequate quantities at a reasonable price. Partly as a result of the Department's patent title difficulties in cancer chemotherapy, in 1960 it was trying to avoid research contracts and use only grants in the future.[20]

It would appear that (except for the National Science Foundation) Government patent policy has fallen loosely into a pattern related to the function of the research. The research and development programs of the Defense and Post Office Departments are aimed at procurement of improved hardware or development of improved processes for use by the Government itself. The contractors are allowed to take title to patents with a royalty-free license to the United States.

In the AEC and NASA mixed situations are presented. Both are concerned with procurement of hardware and development of processes incidental to the furtherance of governmental programs, e.g., atomic military development and military development of space. Both also conduct research for the general welfare of the public, e.g., medical and commercial uses of atomic energy, communications satellites, etc. Under the statutes described above, title to patents is taken by the Government, but this right may be waived in certain circumstances.

The Department of Agriculture conducts research for the purpose of benefiting the agricultural industry. Under the Research and Marketing Act, the Government must take title to patent rights, and no provision is made for waiver of the Government's interest.

HEW has adopted a policy of retaining title to patents in most cases in the absence of any statutory direction. The purpose of its research, too, is direct benefit to general public, with little concern with procurement of invented items for Government use. The same is generally true of VA prosthetic device research, except that the applicable statute provides that the Administrator may make results of the research available to the public.

The late Chairman of the Government Patents Board, Benjamin B. Dowell, recognized that the agencies in which most inventions occur have widely different interests in the use of such inventions and fall into what he called the "procurement group" and the "public service group," defined respectively as follows: "(1) those concerned primarily with the procurement of new and better items of material and equipment for their own use * * *, and (2) those concerned primarily with the development of new items and ideas that would

[20] Hearings, note 19, supra, at pp. 62 and 85; Patent Practices of the Department of Health, Education, and Welfare, Preliminary Report of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, U.S. Senate, 86th Cong., 1st sess. (1960).

advance the national economy and welfare which the may dedicate to the public for free use * * *.[21]

The major exponent of the license policy, the Defense Department, recognizes the difference getween procurement research and public service research by providing that: "Likewise, the Government may obtain title in recognition of the overriding public interest in inventions in fields relating to the health and safety of the public, if their availability for public use will not depend on patent incentives." [22]

Three administrators of patent policy from the Defense Department commented recently in an article in the Federal Bar Journal [23] that: "In fields vitally and immediately affecting the public welfare, such as broadscale penicillin research, weather control, or water desalinification, inventions may be made of such great importance that they will be brought to the point of ready availability for public use without depending in any way on patent incentives. Title in the Government would be a recognition of this overriding public interest."

The general pattern found in a study of the policies followed by the various departments and agencies of Government, is that in research for procurement of commodities or processes for Government use, the title to patents is usually retained by the contractor, depending on special circumstances which include adherence to historical attitudes within the particular department or agency. Where, however, the research is for the purpose of developing inventions in furtherance of the public welfare, the departments and agencies almost unanimously provide that the patents must be made available to the public without royalty.

The purpose of saline water research and coal research is to find and perfect methods and techniques in furtherance of the public welfare, i.e., in the one case to make provision for future anticipated water shortages and in the other to develop markets for coal and thereby relieve depression in the coal-producing sections of the country. Even without an expression by Congress, therefore, these programs, in the context of general governmental policy, would seem to require that the Government take title to patents developed by the research it finances.

A study of the legislation and its history confirms that Congress, mindful of the policies prevailing in the executive departments and agencies and doubtless cognizant of the dangers of permitting administrative discretion, provided that patents developed by federally financed research in the fields of saline water, coal, and helium are to be made available to the public without royalty or other restriction.

LEGISLATIVE HISTORY

Coal Research and Development Act

The purpose of the Coal Research and Development Act of 1960 was stated by Representative Ken Hechler in House debate on the bill, as follows:

"At the present time over 95 percent of our coal mines have no facilities and little or no money for coal research. Under H.R. 3375 the Secretary of the Interior would contract for and coordinate re-

[21] Hearings before Subcommittee No. 3, Committee on the Judiciary, House of Representatives, Mar. 3 and Apr. 25, 1958, p. 22.
[22] Armed Services Procurement Regulations, sec. 9-107.1.
[23] Vol. 21, No. 1, winter, 1961, p. 56.

search to be done mainly by organizations other than the U.S. Bureau of Mines, such as industrial trade associations, educational institutions, State-operated research facilities, and other recognized research groups. The public availability of the practical, coordinated, future findings of such research organizations are very important to all of us and to future generations in terms of the expanded economic growth and defense of our country." [24]

A similar bill had passed both Houses of Congress in 1959 but had been vetoed by President Eisenhower because it established a separate coal research agency outside the Department of the Interior. The vetoed bill contained the same patent provision as the bill enacted in 1960.

Senator Robert Byrd of West Virginia, one of the authors of the Senate version (S. 49) of the vetoed bill, testified before the Subcommittee on Minerals, Materials, and Fuels of the Senate Committee on Interior and Insular Affairs on June 10, 1959, and explained the patent provision thus: "All information resulting from the contracts and otherwise, including patents, would be in the public domain." [25]

The Senate report on the House version of the vetoed bill, containing the same patent provision, stated that "No research would be undertaken or conducted unless the information developed therein would become available to the public." [26]

Both this report and the later House and Senate reports on the bill, which was enacted in 1960, state: "Since much of the research work carried on by such (large) companies is for the purpose of gaining competitive advantages, the technical knowledge and benefits gained from such research activities ordinarily do not become available to others *as they would if conducted by a Government agency.*" [27] [Emphasis supplied.]

This legislative history of the Coal Research and Development Act indicates the congressional intent that federally financed patents and research information be available to the public without payment of royalties.

Saline Water Act

The saline water conversion program was first authorized by the act of July 3, 1952.[28] The act, among other things, empowered the Secretary to conduct research and technical development work by means of contracts and grants. No provisions were made in this act or in later amendments for disposition of patents resulting from such contracts and grants.[29]

In September of 1961, Congress passed a new saline water conversion act to expand and extend the program. The House passed its version of the act, H.R. 7916, without a patent provision on August 21, 1961. During the debate preceding passage, Representative Chet Holifield raised the patent question and was answered by Representa-

[24] 106 Congressional Record 2317, Feb. 15, 1960.
[25] Hearings before the Subcommittee on Minerals, Materials, and Fuels of the Committee on Interior and Insular Affairs, U.S. Senate, on S. 49 and S. 1362, 86th Cong., 1st sess., p. 20.
[26] S. Rept. No. 559, 86th Cong., 1st sess., p. 2.
[27] S. Rept. No. 559, 86th Cong., 1st sess., p. 5, H. Rept. No. 1241, 86th Cong., 2d sess., p. 7, S. Rept. No. 1494, 86th Cong., 2d sess., p. 5.
[28] 66 Stat. 328, 42 U.S.C. 1951–1958.
[29] Act of June 29, 1955, 69 Stat. 198, 42 U.S.C. 1952, 1953, 1958; act of Sept. 2, 1958, 72 Stat. 1706, 42 U.S.C. 1958a–1958g. The 1955 amendment did provide that results or information developed in connection with Government-financed foreign research "be available without cost to the program in the United States herein authorized."

tive Wayne Aspinall, chairman of the House Interior and Insular Affairs Committee:

"Mr. HOLIFIELD. * * * I want to ask the gentleman this question: There will be a great deal of money spent on research and development, together with the development of machinery and hardware of different kinds.

"Is it the intent of the gentleman and his committee that where moneys are spent for these types of hardware, machinery, and different types of things which will be developed under this program, this will be made available to the people of the United States without placing upon them patent royalties and things like that?

"Mr. ASPINALL. As far as the particular bill is concerned now under consideration, that was not taken up, but the gentleman from California knows how I feel about that. I am wholeheartedly in support of that program. We have protected the public wherever public money is spent, and it will be our purpose to do so here.

"Mr. HOLIFIELD. I hope the gentleman will follow along that philosophy, because under the traditional patent policy rights of the people of the United States, he who has research and development is entitled to the patent involved. In this instance if the Government of the United States pays for it, the people of the United States should have it without regard to having to pay patent royalties to individuals who may be fortunate enough to get a Government contract." [30]

Representative Aspinall later took part in the conference committee deliberations which produced the act in its final form.

The day after H.R. 7916 passed the House, the Senate Interior and Insular Affairs Committee held a hearing on four bills also designed to expand and extend the saline water conversion program—S. 2156, S. 22, S. 100, and S. 109. The committee indefinitely postponed action on the latter three bills and acted on S. 2156. Senator Long of Louisiana appeared before the committee during the hearing and proposed an amendment to S. 2156 to include the patent provision which the present act contains. After pointing out that the language of his proposal was identical to the patent language in S. 109, introduced by Senator Clinton Anderson, he said, "If we are going to spend large amounts of Federal money to develop something, I think it should be available for the benefit of all the people rather than have to pay very high royalty fees or even put a contractor in position so that he could veto the rights of that to be used for the general public, by other contractors, or by other levels of government."

Addressing Chairman Anderson, Senator Long said: "You were the man who made the fight to retain in the Space Act the requirement that NASA could not give away patent rights unless it found it to be in the national interest to do so. It is not as strict a provision as you have authored as the chairman of this committee in other respects." [31]

Only if "available" means available without cost, does Senator Long's comment make sense. The Space Act allows the NASA to waive its rights in favor of the contractor. The patent provision in S. 109, authored by Senator Anderson as chairman of the Senate Interior and Insular Affairs Committee, required that patents be

[30] 107 Congressional Record 15470, Aug. 21, 1961.
[31] Hearings before the Committee on Interior and Insular Affairs, U.S. Senate, 87th Cong., 1st sess., on S. 2156, S. 22, S. 100, and S. 109, p. 43 (1961).

made "available" to the public. There was no provision for waiver of Government rights. This was identical to the patent clause finally included in the act.

During debate on S. 2156 after it came out of committee, Senator Gordon Allott of Colorado questioned the wisdom of the patent provision, assuming that under its terms the Government would be required to take title to all patents developed under Government research and development contracts:

"If we follow the amendment literally, we create a situation in which a company which has already devoted its best research talent to the development of a process, after contracting with the Government, finds that anything it develops beyond that belongs to the Government for the use of the public, and it would get no benefit therefrom.[32]

No one contradicted his assumption. Senator Allott was concerned that it might be difficult to let contracts with such a strict patent policy. Senator Alan Bible answered that the experience of NASA indicated that this would not be a real problem. Senator Francis Case said, though, that "the problem posed by the Senator from Colorado is real. I hope, as he suggests, that the conferees will give consideration to the problem when the bill is in conference." No change was made in the provision in conference although Senator Allott was a member of the conference committee. Obviously proponents and opponents of section 4(b) of the Saline Water Act understood it to require the unrestricted availability of foreground patents to the general public.

On August 31, 1961, the Senate passed its version of the act, amending H.R. 7916 by striking out all after the enacting clause and inserting in lieu thereof the text of S. 2156.[33] The bill was then sent to conference committee. When the bill was reported out of conference committee to the House with the patent policy provision inserted, Representative Emilio Q. Daddario strongly opposed the provision on the ground that it would force free licensing to the public of all patents developed under Government contract: "(This legislation) makes the invented concept not only free to the Government—which is as it should be when the Government helps pay for the development—but free to the general public as well." [34]

The bill passed notwithstanding this objection.

At no point during the debates in either House did any opponent or proponent suggest that the patent provision would allow a contractor to take title to a patent arising from Government-financed research and make it available to the public only upon the payment of a royalty.

The history of the Helium Act Amendments of 1960 contains few references to the patent provision. None appear to be relevant to the point at issue here.

Through the histories of both the Coal Research Act and the Saline Water Act runs the continuing thread of understanding by all those legislators who concerned themselves with the Government's patent policy that the results of Government-financed research would be made available without charge to the public. Where similar language has been used in other statutes relating to Government research, their application has been consistent with this conclusion.

[32] 107 Congressional Record 16616, Aug. 31, 1961.
[33] 107 Congressional Record 16628, Aug. 31, 1961.
[34] 107 Congressional Record 18050, Sept. 13, 1961.

STATUTES IN PARI MATERIA

Statutes in pari materia are those which relate to the same thing or which have a common purpose. Under the pari materia rule it is well established that, in the construction of a particular statute, or in the interpretation of its provisions, all statutes having the same general purpose should be read together. Such related statutes may be construed together as though they constitute one law, governed by one spirit and policy. The legislative intention should be ascertained from a view of the whole system of which the statutes are the parts.[35]

The three statutes under consideration here are obviously in pari materia as to their patent provisions. All are concerned with making the results of Government-financed research available to the public. The similarity of these provisions was pointed up particularly in the debate on the saline water conversion bill.[36] Thus the legislative histories of the Coal Research Act and Saline Water Conversion Act as detailed above are relevant to interpretation of one another and of the Helium Gas Act.[37]

Two other acts authorizing contract research in the public interest contain language providing for availability of the results of that research to the public. As detailed earlier, the Agricultural Research and Marketing Act requires in one section that the results of certain research contracted for under its authority be made available to the public "through dedication, assignment to the Government, or such other means as the Secretary shall determine," [38] and in another section that results of other research be made "available to the public by such means as the Secretary * * * shall determine." [39]

The act was passed in 1946. It has consistently been interpreted by the Department of Agriculture to require that the results of all research under the act be made available without cost to the public. Congress had been informed of this interpretation in 1960 and in 1961 when the Coal Research and Saline Water Acts were adopted.[40]

The VA provision authorizing research on prosthetic devices uses the word "available" in a permissive rather than a mandatory sense. It says that the "Administrator may make available to any person the results of his research." [41] While the VA does not always take title to patents arising from its contract research, it does require those contractors who retain title to issue royalty-free licenses to designees of the VA. Only one exception has been made to this policy. That contract was inactive or terminated before 1960, and apparently no royalties have been charged on any patents arising from the contract.[42]

Thus two statutes in pari materia with the acts here under consideration have been administered in such manner that the results of contract research have been made available to the public without

[35] 82 C.J.S. Statutes, sec. 366, p. 803; 2 Sutherland, Statutory Construction, sec. 5201 (3d ed.); *Application of Martin*, 195 F. 2d 303, 39 C.C.P.A. Patents 893; certiorari denied, 73 S. Ct. 24, 344 U.S. 824, 97 L. Ed. 641; *Willapoint Oysters* v. *Ewing*, 174 F. 2d 676.

[36] 107 Congressional Record 16608, 16617, Aug. 31, 1961; 107 Congressional Record 18050, Sept. 13, 1961.

[37] *U.S.* v. *Freeman*, 3 How. 556, 11 L. Ed. 724 states: "If it can be gathered from a subsequent statute in pari materia, what meaning the Legislature attached to a former statute, they will amount to a legislative declaration of its meaning, and will govern the construction of the first statute." See also *Great Northern R. Co.* v. *U.S.*, 62 S. Ct. 529, 315 U.S. 262, 86 L. Ed. 836; *Tiger* v. *Western Investment Co.*, 221 U.S. 286, 31 S. Ct. 578, 55 L. Ed. 738.

[38] 7 U.S.C. 427i(a).

[39] 7 U.S.C. 1624.

[40] See notes 11 and 16 supra; and Patent Practices of the Department of Agriculture, Preliminary Report of the Subcommittee on Patents, Trademarks and Copyrights of the U.S. Senate, 87th Cong., 1st sess. (1961).

[41] 38 U.S.C. 216.

[42] Hearings, supra, note 19, p. 117.

royalty under provisions authorizing the head of the agency simply to make these results "available." This is consistent with the conclusions reached here concerning the use of the same word in the provisions of the Coal Research, Saline Water, and Helium Acts.

PATENT TITLE

It might be argued that if Congress had intended that the Government should take title to patents on all foreground inventions, it would have said so in precise language. While this argument has merit, it is not persuasive in light of the foregoing material. By using the term "available," Congress left the Department an area for the exercise of discretion. Title may be left in the contractor upon agreement that he will license all applicants royalty-free, the Government and contractor could take joint title, or the patent could be dedicated to the public. Precise language requiring the Government to take title was not actually necessary to accomplish the congressional purpose that the results of publicly financed research be unconditionally available to the public.

SUMMARY

The Department, prior to the passage of the Saline Water Act, interpreted the Coal Research Act and Helium Gas Act to give the Secretary a rather broad discretion in making the results of Government-financed research available to the public. Recent studies of the language and histories of these acts and of the Saline Water Act indicate that this position was incorrect. The clear language of the acts requires that foreground patents be available to the public. The entire patent would not actually be available if the contractor retained the right under the patent to collect royalties or to set other conditions on the public use of the patented item.

All "public service group" research agencies, whether bound by statute or not, attempt to follow a general policy of making the results of their research, including patents, available without cost to the public. Probably the most stringent patent policy provision in the Federal law uses the term "available" in requiring free availability of research results under the Agricultural Research and Marketing Act. The act makes no exceptions, nor does it allow the administrator to weigh equities. The other member of the "public service group" governed by a statutory patent provision, the VA, works under similar language.

Two major agencies which conduct research for both procurement and public service purposes are the AEC and NASA. Both are governed by strict patent policy statutes which require the Government to take title unless good cause for waiver is established.

The Office of Coal Research and the Office of Saline Water obviously are engaged in research for public service purposes. It would be inconsistent with the language and the underlying purposes of the acts involved and with the pattern of Government patent policy to ascribe to Congress an intent to establish a policy for availability of the results of this research more restrictive to the public than the policy set for AEC and NASA.

The legislative history of these acts and the history and construction of the same language in other acts involving "public service" research confirm the conclusion that the results of Government-financed research under the Saline Water Act, Coal Research Act, and Helium Act must be made available without cost to the public. This may be accomplished either by requiring assignment of patent title to the Government, by requiring assignment of a joint title interest to the Government, by contractor retention of patent title with a contractual obligation to issue unrestricted and royalty-free licenses to any applicant, by patent dedication, or by any other means designed to secure the same result.

BACKGROUND PATENTS

As stated above, the three acts under consideration require the results of Government-financed research (information, uses, products, processes, patents, and other developments) to be available to the general public unconditionally. Many of the contracts now under negotiation involve the continuation of research and development commenced by the contractor and already protected by contractor-owned patents. The further work to be financed by the Government could result in patents or other developments, the use of which would infringe upon the background patents. Where a contractor owns background patents essential to the practice of processes partly financed by the Government, full public availability of Government-owned foreground patents would be an illusory benefit since the contractor could effectively cut off the availability of these processes by refusing to license background patents.

Many of our larger contracts are for the construction and operation of pilot plants to test and improve processes and devices already patented by the contractor. There is a strong probability that no foreground patents would derive from this work. In any event though, the background processes could not be commercially useful without such testing. In these circumstances a fully tested commercially usable process could result, at least in part, from research financed by the Government. This result would not be available to the public unless the necessary background patents could be licensed on reasonable terms. Since the statutes require the availability to the public of processes resulting from research developed by government expenditure, it must be inferred that they preclude the Secretary from agreeing to terms that do not accomplish such availability.

It is provided, however, that the patent section language of the Helium Gas Act and the Saline Water Act in itself shall not be construed "to deprive the owner of any background patent * * * of such rights as he may have thereunder."[43] Consequently, the contracts signed under these acts cannot be construed, in the absence of express language of agreement, to take rights to background patents.

Other provisions of these acts, though, allow you to acquire patents by purchase in order to accomplish the purposes of the acts. Because of the requirement of availability to the public of the results of foreground research, you should take steps to acquire sufficient interest in background patents to assure the availability of the processes.

[43] Under the pari materia doctrines, this same admonition may be inferred into the Coal Research Act. See note 37 supra.

This may be done in different ways. Since the background positions of the various individual contractors are not uniform the means employed should be determined on a case by case basis. I recommend therefore that the contracting officers be authorized to exercise their discretion as to means to effect the purposes of the law.

FRANK J. BARRY, *Solicitor.*

APPENDIX G

MEMORANDUM

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SOLICITOR,
Washington, D.C., July 25, 1961.

To: Heads of bureaus and offices.
From: Solicitor.
Subject: Department patent policy on inventions made during work performed under research and development contracts.

It is the general policy of the Department of the Interior to take title to any invention made by a contractor in a research and development contract. This goes back to departmental Order No. 1763, issued November 17, 1942, which stated:

"* * * the Government * * * as the representative of the people of the United States should have the ownership and control of any invention developed in the course of its governmental activities."

This policy was approved by the Attorney General's report of 1947, "Investigation of Government Patent Policies and Practices," which stated (p. 4):

"IV. INVENTIONS MADE BY GOVERNMENT CONTRACTORS

"A. FINDINGS AND CONCLUSIONS OF ATTORNEY GENERAL

"1. Where patentable inventions are made in the course of performing a Government-financed contract for research and development, the public interest requires that all rights to such invention be assigned to the Government and not left to the private ownership of the contractor. Public control will assure free and equal availability of the inventions to American industry and science; will eliminate any competitive advantage to the contractor chosen to perform the research work; will avoid undue concentration of economic power in the hands of a few large corporations; will tend to increase and diversify available research facilities within the United States to the advantage of the Government and of the national economy; and will thus strengthen our American system of free, competitive enterprise.

"2. To leave patent rights to the contractor may permit the suppression of an invention paid for by the public, or the imposition of an assessment for its use by the public to serve private advantage. It would constitute an unequal form of reward for comparable performance, and would tend to unbalance Federal research by making more desirable those aspects likely to lead to commercially valuable patent rights.

"3. Expert opinion and experience within and without the Government support the conclusion that a policy of public ownership of inventions made under Government contract would be acceptable to a sufficient number of competent private and institutional laboratories to make it workable. However, exceptions to the basic policy should be allowed where necessary in emergency situations, to permit the contractor to retain the patent rights to inventions to which he has already made a substantial independent contribution; but in all such cases the Government should obtain at least a free license under the resulting inventions and should prohibit their suppression or the assessment of unreasonable charges for their use by others.

"4. The weight of evidence is that the policy recommended herein will not substantially increase the costs of Government research contracts, nor diminish the efforts of the contractor's organization to perform the work competently. To the extent that extra costs may result from the recommended policy, they would be fully justified by the advantages of making publicly financed technology broadly and freely available."

It will be noted that item 3 of the above quoted portion of the Attorney General's recommendations make provisions for exceptions to the general rule of the Government taking title, where it would be inequitable for the Government to take all patent rights.

Secretary of Interior Krug, in a letter to President Truman dated February 4, 1947, commenting on this report stated:

"* * * It seems clear that the Government should be entitled to the ownership (including foreign rights) of inventions developed with appropriated funds, either in Government laboratories by Government personnel or in private industry as a result of Government-financed research. The people of the United States should not have to pay twice, once through taxes and again in the form of royalties, for inventions which they have financed. * * *.

"Although a number of scientific and technical men fear that research and development contracts with private concerns and even with universities cannot be negotiated by the Government without granting to the other parties full commercial rights in any invention developed in the course of such contracts, with the Government receiving only a license to use the inventions, I believe that, in principle, the Government should have the right of ownership in these federally financed inventions if it chooses to exercise such right. In any event, it seems advisable to adopt, at least for a trial period, a Government-wide policy which insists upon this right, but allows the agency heads to exercise * * * a certain amount of discretion in the administration of the policy."

To sum up, the policy of the Department is to take title to any invention made under a research and development contract, except where it would be inequitable for the Department to take title because of substantial independent contributions made to the invention by the contractor.

Under the latter situation, the Government is given a royalty-free, nonexclusive license for governmental purposes. In the case of research under the Saline Water Act, the Coal Research Act and the Helium Act, because of the language of the statutes, or the intention of Congress, the contractor is also required to grant licenses to the public at reasonable royalties.

Responsibility for the Department's patent policy was delegated to the Solicitor in 1945. To carry out this duty and to make sure that all research and development contracts are in line with the Department's policy, the following procedure will be followed:

Before any research and development contract is signed, wherein the Government does not take title to any inventions arising therefrom, the facts and circumstances which in the opinion of the contracting agency justify leaving title with the contractor should be specified in detail. These may include, for example, a recital of the contractor's background position in the field, his financial investment in the study of the problem, his technical know-how, special equipment, scientific and technical staff, and other factors which would be evidence indicating it would be inequitable for the Government to take title to any invention arising out of the contract.

Such contract with the attached justification must be submitted to the Solicitor for review and approval before it shall be signed by the authorized agency officer.

FRANK J. BARRY, *Solicitor.*

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